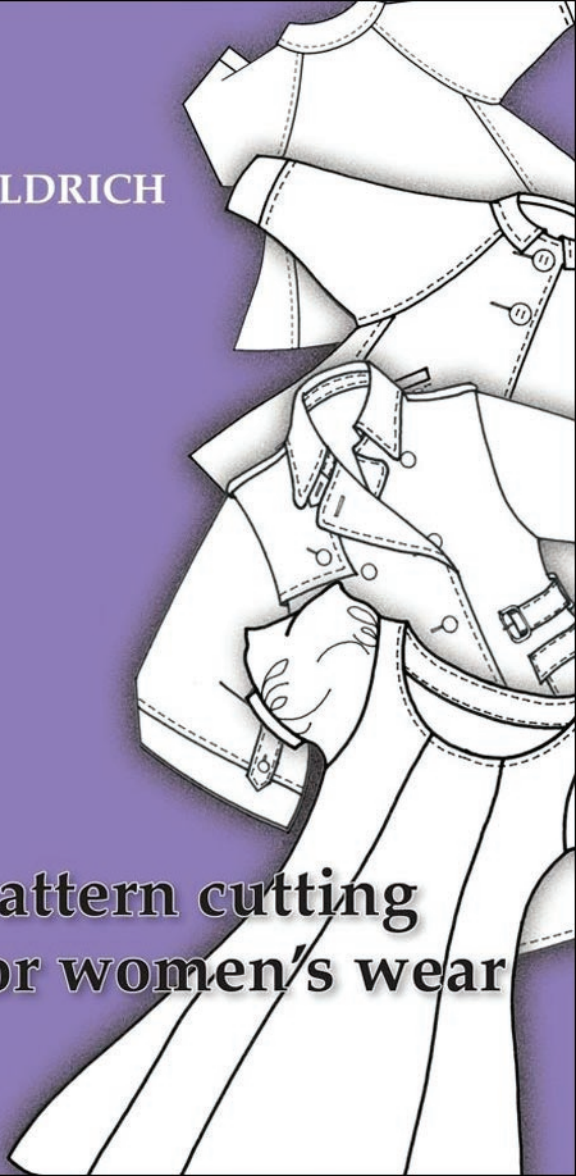
WINIFRED ALDRICH



5TH EDITION

metric pattern cutting for women's wear

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Metric Pattern Cutting for Women's Wear

Fifth edition

Winifred Aldrich

Blackwell Publishing

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Introduction

Revised edition 2008 This fifth edition of the original book remains true to its original concept, which offered a range of good basic blocks, an introduction to the basic principles of pattern cutting and gave a few examples of their application into garments. The principal aim was to give students confidence in their ability to develop a unique style of pattern cutting and to offer tutors a starting point from which they could extend their students' knowledge.

The new inclusions offered in the 2004 edition remain. These responded to the way fabrics and fashion have changed the cut and sizing of garments in different manufacturing processes. The great expansion of casual wear, in jersey or stretch fabrics, has led to the expansion of *flat cutting* with no darting to create the shape. The 2004 edition devoted a whole section to this type of cutting and the section has been extended in this edition. However, students have to understand how to create shape through cutting alone, in fact, *form cutting*, and therefore the first section of the book still covers this technique.

The major difference in this new edition is the *introduction of colour*. This will help students to recognize the different coded sections in the book. The addition of colour offers a major improvement to the updated chapter on computer-aided design (CAD). This now offers to first year design and clothing students a good introduction to the technology.

The size charts have been revised in order to respond to changes in body sizing, co-ordination with European size charts and to the ways that clothes are marketed to different sectors of the population. As many of the stores selling High-street fashion are attracting younger 'early teen' customers, the size chart for this market sector has been extended down to a size 6.

The book remains written for beginners, students who are starting practical pattern cutting as part of fashion degree or diploma courses or for students in upper schools who are studying advanced dress and textile subjects. Chapter 13 deals specifically with drafting the block for individual figures. This will be useful for women who make clothes for themselves, in order to create and develop their own individual style, or women who find mass produced clothes an uneasy fit.

Some garment patterns, particularly in couture design, are constructed by draping on the dress stand. However, pattern cutting from blocks or adaptation of existing patterns is now widely used by the dress trade because of its accuracy of sizing and the speed with which ranges can be developed. Pattern cutting by this method is a means of achieving a shape around the body so that, although the body and therefore the body blocks remain constant, there is no limit to the ideas that can be followed through into workable designs. However, the designer must always be conscious that the body is a form. This can be difficult when one has to relate flat pieces of paper to a design that is basically sculptural when it is completed. In addition, the form will move and this must be exploited in the cut of the garment. A moving shape is more visually exciting than a still form, but there are practical problems to be considered in allowing for this movement. The system of pattern cutting offered in this book attempts to make the student more fully aware of designing round the figure rather than seeing it as a body that possesses only a front view.

Pattern cutting should be used in conjunction with a dress stand. This means that as the design evolves, proportion and line can be checked and corrected. Pattern cutting can achieve a shape quickly, but more complicated styles should be made up into a muslin or calico toile so that the result can be assessed on a form or a moving figure.

Pattern cutting and design

Pattern cutting by adapting shapes from block patterns can be traced back to the middle of the nineteenth century. As the craft developed the basic rules evolved, but rules can be broken or changed if this comes from new creative directions. This concept of design has been responsible for the most exciting changes in shape and cut during the last century. Poiret, Vionnet and Chanel, sensitive to social and aesthetic influences, 'promoted the body' after it had been enclosed in structures for a century. Although their interpretations differed, they were the innovators of soft, easy fitting clothes. Today, the changing social attitudes of many women have changed their attitudes to fashion; they buy clothes to satisfy themselves and they are not prepared to be restricted to a dictated line for a season or by an outdated image of femininity.

Marrying design to fashion is a difficult process; it can be overwhelmed by bizarre effects created by some stylists in the fashion media. They have produced alternative images to the classic stylised fashion page by their eclectic choice of garments and their role has become increasingly important because of the power they have to begin or influence major trends.

Designing at the level of couture or small designer collections is very different from that of designing for a mass market. Garments created for an individual client give a designer more freedom. The cost factor becomes less important and this allows the original idea to be carried through. Interesting fabrics that are difficult to handle can be used, and their surface qualities emphasised by decorative techniques. The 'cut' of the garment is usually determined by draping on the stand, where the intricacies of the cut can be developed. Designing for individual clients allows the personality of the wearer to be fused with the original idea. The rise of celebrity in the music industry and the media has developed a new, exciting market for some top designers; it is a means by which they can promote their designs and their name. Most major designers also create 'designer collections' which are produced by manufacturing processes but the high price of the garments allows the 'signature' of their cut to remain and limited runs of specially printed or woven fabrics to be used.

The most limiting factors in designing for mass production are price and the production processes. Clothes also have to have 'hanger appeal'; that is, people will be tempted to try them on or buy them for their look alone. Often dresses that look sensational on a moving body can look limp and featureless on a clothes rail. There are two types of successful designers in the mass production fashion trade. The first group is employed by 'production-led' manufacturers; these designers can develop current fashion shapes but recognise that fabric economy and repeat making-up methods are the priority. The second group is employed by 'design-led' manufacturers; they are able to produce original ideas and experiment with new fabrics and production processes.

There are some basic elements of design that affect or may limit a designer in any field.

Colour and pattern These are the most dominant features in a fashion trend. Each season a colour theme emerges, occasionally spontaneously, sometimes influenced by top designers. However, most mass retailers rely on the style and colour predictions of the major forecasting agencies. New technologies now offer a revolution in printed textiles. Instead of allover repeat designs, unrepeating patterns and new scales of pattern can be achieved, thus offering new concepts in which decoration is integral to the whole design.

Fabric quality New technologies have also expanded the range of fabrics available to a designer. The aesthetic qualities of a fabric are often the inspiration which initiates a design. However, in creating a new shape a designer has to consider five crucial fabric qualities which could realize or destroy it. These are: *weight, thickness, shear, drape* and *stretch.* Whilst large companies have testing procedures that can determine technical measures, the designer often has to make instant judgements and therefore has to be able to estimate the qualities of a fabric and idealise the final effect.

Shape Whilst recognising the crucial role that fabric choice plays in the realisation of design, its success rests with the quality of the pattern cutting. The domination of stretch fabrics in the mass market have meant an expansion of simple *flat pattern cutting* techniques which rely on the stretch in the fabric to create the body shape. But stretch fabrics can be married with *form cutting* to give quite different effects. Bias cutting adds to the drape quality of fabrics, and the use of layers can affect the weight and thickness of the design. *Form cutting* of close fitting garments in fabrics without sheer or drape, such as stiff silks, requires great skill.

Line The interpretation of line and cut is the most complex part of a designer's work. Once a fashion shape becomes established, the variations in cut to achieve it are infinite. The designers must use their skills to produce a range that will translate the latest fashion across a range of sizes.

Garment sampling

Garment samples are prototype garments that are made up so that the designer can check and refine both the pattern and the construction of the garment.

In the early stages of the process a dress stand will be used, but final decisions are usually taken when a live model wears the garment. It is at this stage that the other major design decisions, *colour* and *pattern*, *fabric quality*, *shape* and *line* can finally be assessed.

It should be noted that at the present time much discussion has been taking place in the fashion press about the unreality of some designers using size 6 or size 8 models to display clothes, when the average size for women is approximately size 14.

Fabrics

Designers have to acquire a deep understanding of the qualities of fabrics. Many designers specialise in designing a particular product, for example lingerie or sportswear. This means that they have to understand the basic properties of fabrics and testing procedures and be assured that the fabric will perform well for their particular product.

The designer has to become familiar with the types of woven and knitted structure of fabric. Knowledge of the basic source of fabrics and how this affects the enormous number of finishes that can be applied to fabrics has to be acquired. However, the most important qualities that a designer must consider when creating a design are: *weight, thickness, drape, stretch* and *shear* (the amount the fibres distort in the warp and weft). These qualities will affect quite dramatically how a pattern will be cut and how the final shape will be realised. A list of fabrics is shown below that is categorised into the different fabric weights. Weight and thickness are generally closely linked, but some thick pile fabrics constructed with man-made fibres can be deceptively light. Shear and drape are also often closely linked – these qualities allow the cutting of soft body skimming shapes. Today, the popularity of stretch fabrics, both woven and knitted, has been the most influential factor in cutting for mass produced garments. In the edited list of fabrics below, knitted fabrics are listed in all columns because of the huge variety in different weights.

Light–med.	**Medium**	**Med.–heavy**	**Heavy**
Afgalaine	Alpaca	Bedford cord	Astrakhan
Angora	Bagheera	Bouclé	Beaver
Bengaline	Barathea	Broadcloth	Double
Cashmere	Bark crêpe	Burlap	Duffle
Chino	Brocade	Camel hair	Felt
Chintz	Butcher	Canvas	Fur fabric
Ciré	Calico	Chenille	Knitted fabric
Crepon	Cavalry twill	Cheviot	Loden cloth
Dupion	Cloqué	Corduroy	Melton
Faille	Coutil	Donegal tweed	Plush
Foulard	Covert	Drill	Quilted
Gingham	Crêpe	Duck	
Homespun	Damask	Dungaree	
Honan	Denim	Duvetyn	
Knitted fabric	Doeskin	Flannel	
Lamé	Façonne velvet	Fleece	
Matelasse	Gabardine	Flock	
Mohair	Grenadine	Fustian	
Moiré	Grosgrain	Harris tweed	
Ottoman	Haircord	Honeycomb	
Panama	Hopsack	Intarsia	
Percale	Jacquard	Knitted fabric	
Piqué	Jean	Llama fabric	
Sateen	Knitted fabric	Moleskin	
Satin	Panne velvet	Tapestry	
Shantung	Repp	Ticking	
Sharkskin	Sailcloth	Tweed	
Slipper satin	Saxony	Velour	
Surah	Serge	Venetian	
Taffeta	Suitings	Vicuna fabric	
Tricot	Tartan	Whipcord	
Tussore	Velvet	Worsted	
	Velveteen		

Tools and equipment for making patterns

A student should aim to acquire a good set of equipment. However, some items are very expensive. The items marked with an asterisk (*) denote those that are not essential immediately.

Working surface A flat working surface is required. Ideally, it should be 90–92 cm high.

Paper Strong paper is used for patterns. Parchment or thin card should be used for blocks that are used frequently.

Pencils Use hard pencils for drafting patterns (2H), coloured pencils for outlining complicated areas.

Fibre pens For writing clear instructions on patterns.

Rubber

Metric ruler

Curved rule For drawing long curves.

Metre stick

Set square A large set square with a 45° angle is very useful; metric grading squares can be obtained.

Metric tape measure

Tracing wheel

Shears Use separate shears for cutting cloth and paper as cutting paper will blunt the blades.

Sellotape

Pins

One quarter and one fifth scale squares These are essential for students to record pattern blocks and adaptations in their notebooks.

Stanley knife

Tailor's chalk For marking out the final pattern onto the cloth and for marking fitting alterations.

Toile fabrics Calico is used for making toiles for designs in woven fabrics. Make sure the weight of the calico is as close to the weight of the cloth as possible. Knitted fabric of the same stretch quality must be used for making toiles for designs in jersey fabrics.

**Metric square*

**Calculator* The calculator is now a common tool in all areas of skill. If a calculator is not available use the table of aliquot parts (see Appendix, page 212).

**French curves* Plastic shapes and curves are available in a range of sizes; they are useful for drawing good curves. A flexicurve which allows a shape to be manipulated is also available.

**Pattern notcher* This is a tool that marks balance points by snipping out a section of pattern paper.

**Pattern punch*

**Pattern hooks*

**Pattern weights* These keep pieces of pattern in position on paper or cloth.

**Model stands* Although not essential for a beginner, they are invaluable to the serious student for developing designs.

**Computer equipment* A description of computer equipment can be found on pages 191–211.

The equipment above can be obtained from:
Franks Ltd, Kent House, Market Place, London W1W 8HY. Tel: 0207 636 1244; e-mail: info@rdfranks.co.uk
Morplan, 56 Great Tichfield Street, London W1W 7DF. Tel: 01279 435 333; e-mail: web.support@morplan.com
Eastman Staples Ltd, Lockwood Road, Huddersfield HD1 3QW. Tel: 01484 888 888; e-mail: enquiries@eastman.co.uk

PART ONE: CLASSIC FORM CUTTING

1 The basic darted bodice blocks

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The close fitting bodice block 16
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The tailored jacket blocks (close and easy fitting) 20
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The one-piece sleeve block 24
The two-piece sleeve block 26
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Industrial sizing systems

Measurement surveys collect measurement data to produce sizing systems, they are very costly. To obtain reliable data, thousands of subjects have to be measured and it is very difficult to obtain public money for the task. The last survey that was entirely funded by the government and made publicly available, was in 1957. Recent surveys have been private ones done by individual companies or have been joint enterprises between the government and large retailers. As the companies have borne all, or a proportion, of the costs they see the information as commercially valuable and therefore it is withheld from public use. This has happened to the data from the latest British survey which took place under the direction of the Department of Computer Science, University College, London. The survey was carried out using computer scanning equipment. A number of systems are now available to companies. Although some problems remain, the scanners can now make reliable recordings of most of the principal body measurements required for clothing. They can also create 3D images of the body which give useful information about the changing shape of the population. The biggest problem remains the cost; in the present financial climate few companies are willing to invest in such innovative technology and they are nearly all in operation in government sponsored projects. A large number of surveys, particularly those in developing countries, are undertaken using manual techniques. A researcher from Manchester Metro University has developed a system of manual measurement using an anthropometric stand and a special harness.

British and European standards

The British Standards Institution (BSI) has usually been a main guide to sizing, measurements and labeling. Four new standards under the heading *Size Designation of Clothes* have been adopted from CEN, the European Committee for Standardization. Most European countries, including the UK, have signed to adopt the standards agreed. The standards offered by BSI at present are:

BS EN 13402-1: 2001 *Terms, definitions and body measurement procedures.*
BS EN 13402-2: 2002 *Primary and secondary dimensions* (used for garments labeling).
BS EN 13402-3: 2004 *Measurements and intervals.*

The standard offers sizing in 4 cm and 6 cm intervals. It was expected that a further standard, BS EN 13402-4, a new coding system for garments, would be published during 2006. However, the different countries could not reach an agreement on the coding methods offered. The standard is therefore delayed whilst new proposals are considered.

The use of the standards by manufacturers is voluntary and explains the anarchic systems of sizing that are found in High-street garment retailers. Despite the work taking place to obtain more consistent sizing both in the UK and Europe, the garments on sale in large and small retail outlets appear to be giving less and less information. Pictograms with body measurements have virtually disappeared. Few size charts that relate size codes to body measurements are available in the stores and many of the labels on garments only display a size code. The large retailers argue that this practice is a response to customers' demands for simple labeling and that most women recognise their size code. In practice many women appear to select across two or three size codes depending on the store or the style.

Size charts of body measurements and coding

The retail clothing sector that sells High-street fashion to the young market uses size charts that fit a youthful or athletic figure. Their ranges are very attractive to young teenagers and therefore many companies in this market have extended the lower end of their size range and reduced the upper end of the range. Two size charts for this market are included in the book.

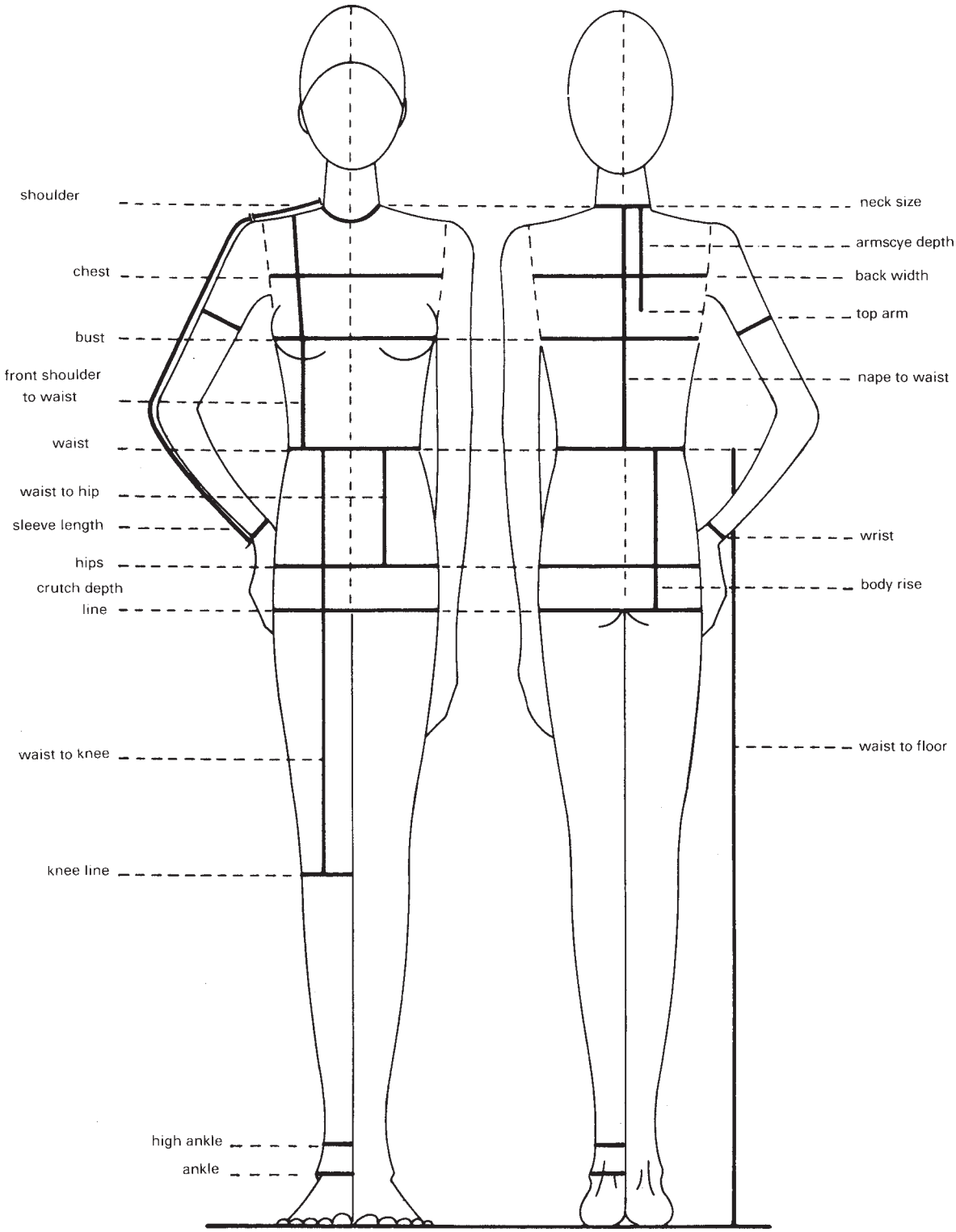
Size charts of body measurements for the mass-market now appear to offer more generous measurements within the coding system and some companies are extending the ranges of larger sizes.

Mail order catalogues offer customers body size charts with the related code numbers 10, 12, 14, etc, but it is apparent that the measurements vary with reference to their niche markets.

Size charts of body measurements in this book

(1) Body measurements – for young high fashion retail outlets, sizes 6–16, page 12.
(2) Body measurements – for young high fashion retail outlets, sizes XS, S, M, L, XL, page 12.
(3) Body measurements – for women's standard sizes, 4 cm and 6 cm increments, sizes 8–22, page 13.
(4) Body measurements – for women's standard sizes, XS, S, M, L, XL, page 14.

Standard body measurements



Body measurement chart for High-street fashion garments

(This size chart is useful for students creating high fashion wear to fit model figures.)

The retail sector that sells high fashion to the young market uses size charts that fit a youthful or athletic figure. Their ranges appeal to young teenagers and therefore many companies in this market have extended the lower end of their size range and reduced the upper end of the range. This size chart reflects these marketing pressures. The even size increments between the sizes have been constructed for simple grades.
Note For garments sizes (e.g. cuff sizes and trouser bottom widths) see the size chart on page 13.

Young women of medium height, l60–172 cm (5 ft 3 in–5 ft 7½ in)						
Size code	**6**	**8**	**10**	**12**	**14**	**16**
bust	76	80	84	88	92	96
waist	56	60	64	68	72	76
low waist (6 cm below waist)	68	72	76	80	84	88
hips	82	86	90	94	98	102
back width	31.4	32.4	33.4	34.4	35.4	36.4
chest	28.8	30	31.2	32.4	33.6	34.8
shoulder	11.5	11.75	12	12.25	12.5	12.75
neck size	34	35	36	37	38	39
dart	5.2	5.8	6.4	7	7.6	8.2
top arm	25.5	26.5	27.5	28.5	29.5	30.5
wrist	14.5	15	15.5	16	16.5	17
ankle	22.5	23	23.5	24	24.5	25
high ankle	19.5	20	20.5	21	21.5	22
nape to waist	39.8	40.2	40.6	41	41.4	41.8
front shoulder to waist	39.8	40.2	40.6	41	41.4	41.8
armscye depth	19.8	20.2	20.6	21	21.4	21.8
waist to knee	57	57.5	58	58.5	59	59.5
waist to hip	19.7	20	20.3	20.6	20.9	21.2
waist to floor	101	102	103	104	105	106
body rise	25.9	26.6	27.3	28	28.7	29.4
sleeve length	57	57.5	58	58.5	59	59.5
sleeve length (jersey)	53	53.5	54	54.5	55	55.5

Body measurement chart for High-street fashion garments: XS, S, M, L, XL

Size symbol	**XS 6**	**S 8–10**	**M 12**	**L 14–16**	**XL 18**
bust	76	82	88	94	100
waist	56	62	68	74	80
low waist	68	74	80	86	92
hips	82	88	94	100	106
back width	31.4	32.9	34.4	35.9	37.4
chest	28.8	30.6	32.4	34.2	36
shoulder	11.4	11.8	12.2	12.6	13
neck size	34	35.5	37	38.5	40
dart	5	6	7	8	9
top arm	25.5	27	28.5	30	31.5
wrist	14.6	15.3	16	16.7	17.4
ankle	22.6	23.3	24	24.7	25.4
high ankle	19.6	20.3	21	21.7	22.4
nape to waist	39.8	40.4	41	41.6	42.2
front shoulder to waist	39.8	40.4	41	41.6	42.2
armscye depth	19.8	20.4	21	21.6	22.2
waist to knee	57.1	57.8	58.5	59.2	59.9
waist to hip	19.8	20.2	20.6	21	21.4
waist to floor	101	102.5	104	105.5	107
body rise	26	27	28	29	30
sleeve length	57.1	57.8	58.5	59.2	59.9
sleeve length (jersey)	53.1	53.8	54.5	55.2	56.9

XS = extra small
S = small
M = medium
L = large
XL = extra large

Standard body measurements – women's sizing, 4 cm and 6 cm increments

This chart, constructed for women's standard sizing, differs from the size chart on page 12; it reflects a mature figure with increased measurements for the waist, hips and also front shoulder to waist measure in the larger sizes. It is based on 4 cm and 6 cm bust increments between the size codes and is compliant with the body measurement size chart given in the standard BS EN 13402-3. Despite variations in body sizes, the general trend is for body size to increase with height. See the special table below for short or tall women.

Women of medium height, 160–172 cm (5 ft 3 in–5 ft 7½ in)											
Size code	**6**	**8**	**10**	**12**	**14**	**16**	**18**	**20**	**22**	**24**	**26**
bust	76	80	84	88	92	96	100	104	110	116	122
waist	60	64	68	72	76	80	84	88	94	100	106
low waist	70	74	78	82	86	90	94	98	104	110	116
hips	84	88	92	96	100	104	108	112	117	122	127
back width	31.4	32.4	33.4	34.4	35.4	36.4	37.4	38.4	39.8	41.2	42.6
chest	28.8	30	31.2	32.4	33.6	34.8	36	37.2	39	40.8	42.6
shoulder	11.5	11.75	12	12.25	12.5	12.75	13	13.25	13.6	13.9	14.2
neck size	34	35	36	37	38	39	40	41	42.4	43.8	45.2
dart	5.2	5.8	6.4	7	7.6	8.2	8.8	9.4	10	10.6	11.2
top arm	24.8	26	27.2	28.4	29.6	30.8	32	33.2	35.2	37.2	39.2
wrist	14.5	15	15.5	16	16.5	17	17.5	18	18.7	19.4	20.1
ankle	22.5	23	23.5	24	24.5	25	25.5	26	26.7	27.4	28.1
high ankle	19.5	20	20.5	21	21.5	22	22.5	23	23.7	24.4	25.1
nape to waist	39.8	40.2	40.6	41	41.4	41.8	42.2	42.6	43	43.4	43.8
front shoulder to waist	39.8	40.2	40.6	41	41.4	42.3	43.2	44.1	45	45.9	46.8
armscye depth	19.8	20.2	20.6	21	21.4	21.8	22.2	22.6	23.2	23.8	24.4
waist to knee	57	57.5	58	58.5	59	59.5	60	60.5	61	61.5	62
waist to hip	19.7	20	20.3	20.6	20.9	21.2	21.5	21.8	22.1	22.4	22.7
waist to floor	101	102	103	104	105	106	107	108	109	110	111
body rise	25.9	26.6	27.3	28	28.7	29.4	30.1	30.8	31.8	32.8	33.8
sleeve length	57	57.5	58	58.5	59	59.5	60	60.25	60.5	60.75	61
sleeve length (jersey)	53	53.5	54	54.5	55	55.5	56	56.25	56.5	56.75	57
Extra measurements (garments)											
cuff size shirts	20.5	21	21	21.5	21.5	22	22.5	23	23.5	24	24.5
cuff size, two-piece sleeve	13	13.25	13.5	13.75	14	14.25	14.5	14.75	15	15.25	15.5
trouser bottom width	20.5	21	21.5	22	22.5	23	23.5	24	24.5	25	25.5
jeans bottom width	18	18.5	18.5	19	19	19.5	19.5	20	20	21	21

Tall and short women

Size charts for tall or short women have each of the following vertical measurements adjusted as shown in the size chart.

	Short women (cm) (152–160 cm (5 ft–5 ft 3 in))	**Tall women (cm) (172–180 cm (5 ft 7½ in–5 ft 10½ in))**
nape to waist	–2	+2
scye depth	–0.8	+0.8
sleeve length	–2.5	+2.5
waist to knee	–3	+3
waist to floor	–5	+5
body rise	–1	+1

Standard body measurements: XS, S, M, L, XL

This size chart reflects the larger average size of women today. The medium size is set at 12–14. This type of chart is used mainly for leisure wear and particularly for garments in mail order catalogues.
The size chart has 8 cm grades between the codes, with a half grade at **XS**.
The **XXS** (extra-extra small) and **XXL** (extra-extra large) sizes are rarely used by the major retailers.
Note 1 A large number of garments made in these sizes are made in jersey fabric, therefore the front shoulder to waist measure remains the same.
Note 2 High-street stores aimed at the younger, fashionable market, generally use a size 12 as their medium size (see page 12).

XS = extra small
S = small
M = medium
L = Large
XL = extra large

Women of medium height l60–172 cm (5 ft 3 in–5 ft 7½ in)					
Size symbol **Bust (control meas. to fit)**	**XS** **74–78**	**S** **78–86**	**M** **86–94**	**L** **94–102**	**XL** **102–110**
Approx. UK size codes	**6–8** **(half grade)**	**8–10**	**12–14**	**16–18**	**20–22**
bust (meas. for drafting)	78	82	90	98	106
waist	62	66	74	82	90
low waist	72	76	84	92	100
hips	86	90	98	106	114
back width	32	33	35	37	39
chest	29.4	30.6	33	35.4	37.8
shoulder	11.7	11.9	12.4	12.9	13.4
neck size	34.5	35.5	37.5	39.5	41.5
dart	5.4	6	7.2	8.4	9.6
top arm	25.4	26.6	29	31.4	33.8
wrist	15	15.5	16.5	17.5	18.5
ankle	23	23.5	24.5	25.5	26.5
high ankle	20	20.5	21.5	22.5	23.5
nape to waist	40	40.4	41.2	42	42.8
front shoulder to waist	40	40.4	41.2	42	42.8
armscye depth	20	20.4	21.2	22	22.8
waist to knee	57.3	57.8	58.8	59.8	60.8
waist to hip	19.8	20.1	20.7	21.3	21.9
waist to floor	101.5	102.5	104.5	106.5	108.5
body rise	26.3	27	28.4	29.8	31.2
sleeve length	57.3	57.8	58.8	59.8	60.8
sleeve length (jersey)	53.3	53.8	54.8	55.8	56.8

Constructing blocks

Block patterns

A block pattern is a foundation pattern constructed to fit an average figure. The average measurements of women are obtained by clothing manufacturers from sizing surveys.

The designer uses a foundation pattern (block) as a basis for making the pattern for a design. They may introduce style lines, tucks, gathers, pleats or drapes but still the basic fit of the pattern will conform to the block used. The finished pattern is made up into a calico toile to check the proportions and shape. The design is then cut out in fabric and made up. This is termed a sample. The size of the sample will depend on the niche market of the company. Manufacturers of high fashion garments will use a smaller size than the companies that cater for the general market. If buyers accept the design and orders are received the pattern is then graded into the sizes required.

Block patterns – general information

Instructions are given for a wide range of basic garments. The blocks include the basic amount of ease required for the function of the block; for example, a dress block requires less ease than a jacket block. Some blocks offer a further choice of ease; for example, the overgarment block can be drafted to be close fitting for a formal coat or to be an easier fitting coat. It is important that the correct block is chosen for the design; this not only saves time during adaptation but can affect the final shape. For example, the close fitting bodice block has a wide dart to produce shaping for the bust, this shaping is too acute for many easy fitting designs so the easy fitting block would provide a better base.
Special note The blocks should be drafted in full scale so that students understand block construction and become aware of body proportions.

Intermediate blocks

Some manufacturers construct intermediate blocks; these are basic shapes that are in use continually, for example the kimono block, the 'A' line skirt block or a particular shape on which a range of designs has been based. The latter is often developed for a particular fashion shape; this type of 'fashion block' may only be used for one season. As manufacturers change to computer grading systems and to computer aided design, intermediate blocks will be used increasingly. Their data can be stored and recalled for rapid adaptation and grading, thus improving efficiency.

Block patterns – individual figures

The basic blocks can be drafted to fit individual figures by using personal measurements instead of the standard ones listed in the size chart. Methods of taking personal measurements and alterations for difficult figures are included in Chapter 13.

Seam allowances

There is no seam allowance included in the blocks. These are added after the pattern is constructed. See the section on seam allowances on page 34.

Types of basic blocks available in the book

Blocks for form cutting

(1) The close fitting bodice block (page 16).
(2) The easy fitting bodice block (page 18).
(3) The tailored jacket blocks – close or easy fitting (page 20).
(4) The classic coat blocks – close or easy fitting (page 22).
(5) The one-piece sleeve block. The block can be constructed for all the above blocks (page 24).
(6) The two-piece sleeve block. The block can be constructed for all the above blocks (page 26).
(7) Block modification for sleeveless and waist shaping (pages 28 and 29).
(8) The dress blocks – one-piece and two-piece (page 30).
(9) The shaped kimono blocks (page 62).
(10) The tailored skirt block (page 80).
(11) The classic tailored trouser block (page 100).
(12) The very close fitting trouser/jeans block (page 106).

Blocks for flat cutting

(1) The easy fitting trouser block (page 132).
(2) The simple trouser block (page 134).
(3) The simple and very simple skirt blocks (page 134).
(4) The basic shirt block (page 140).
(5) The basic flat overgarment blocks (page 142).
(6) The flat kimono block (page 142).
(7) A range of blocks for basic and easy fitting casual and jersey wear (pages 150 and 156).
(8) A range of knitwear blocks (pages 158–160).
(9) A range of close fitting (body shape) blocks – for stretch fabrics (pages 164–170).

The close fitting bodice block

This is a close fitting block. If easy fitting styles with less dart shaping are required use the easy fitting block on page 18.

Measurements required to draft the block

Measurements from any of the size charts in this book (pages 12–14) or personal measurements (see page 178) can be applied to the block.
A size 12 from the size chart on page 12 (for fashion garments) is used for this illustrated example.

bust	88 cm	shoulder	12.25 cm
nape to waist	41 cm	back width	34.4 cm
waist to hip	20.6 cm	dart	7 cm
armscye depth	21 cm	chest	32.4 cm
neck size	37 cm		

Square down from 0; square halfway across the block.
0–1 1.5 cm.
1–2 armscye depth measurement plus 0.5 cm; square across.
2–3 half bust plus 5 cm [i.e. for 88 cm bust: (88 ÷ 2) + 5 = 49]. Square up and down; mark this line the centre front line.
3–4 = 0–2
When using body sizes from the standard body measurement chart (page 13) or personal measurements (page 178):
Add an extra 0.5 cm for each size up above size 14. Example for size 20: **3–4** = 0–2 plus 1.5 cm.
1–5 nape to waist measurement; square across to 6.
5–7 waist to hip measurement; square across to centre front line. Mark point 8 (this gives half hip measurement plus 2.5 cm ease).

Back

0–9 one fifth neck size minus 0.2 cm; draw in back neck curve 1–9.
1–10 one fifth armscye depth measurement minus 0.7 cm; square halfway across the block.
9–11 shoulder length measurement plus 1 cm; draw back shoulder line to touch the line from 10.
12 centre of shoulder line.
12–13 draw a dotted line 5 cm long and sloping inwards 1 cm. Construct dart 1 cm wide with this line as centre (make both sides of dart the same length).
2–14 half back width measurement plus 0.5 cm ease; square up to 15.
14–16 half the measurement 14–15.
17 midway between 2 and 14; square down with a dotted line to point 18 on waistline, and point 19 on the hipline.

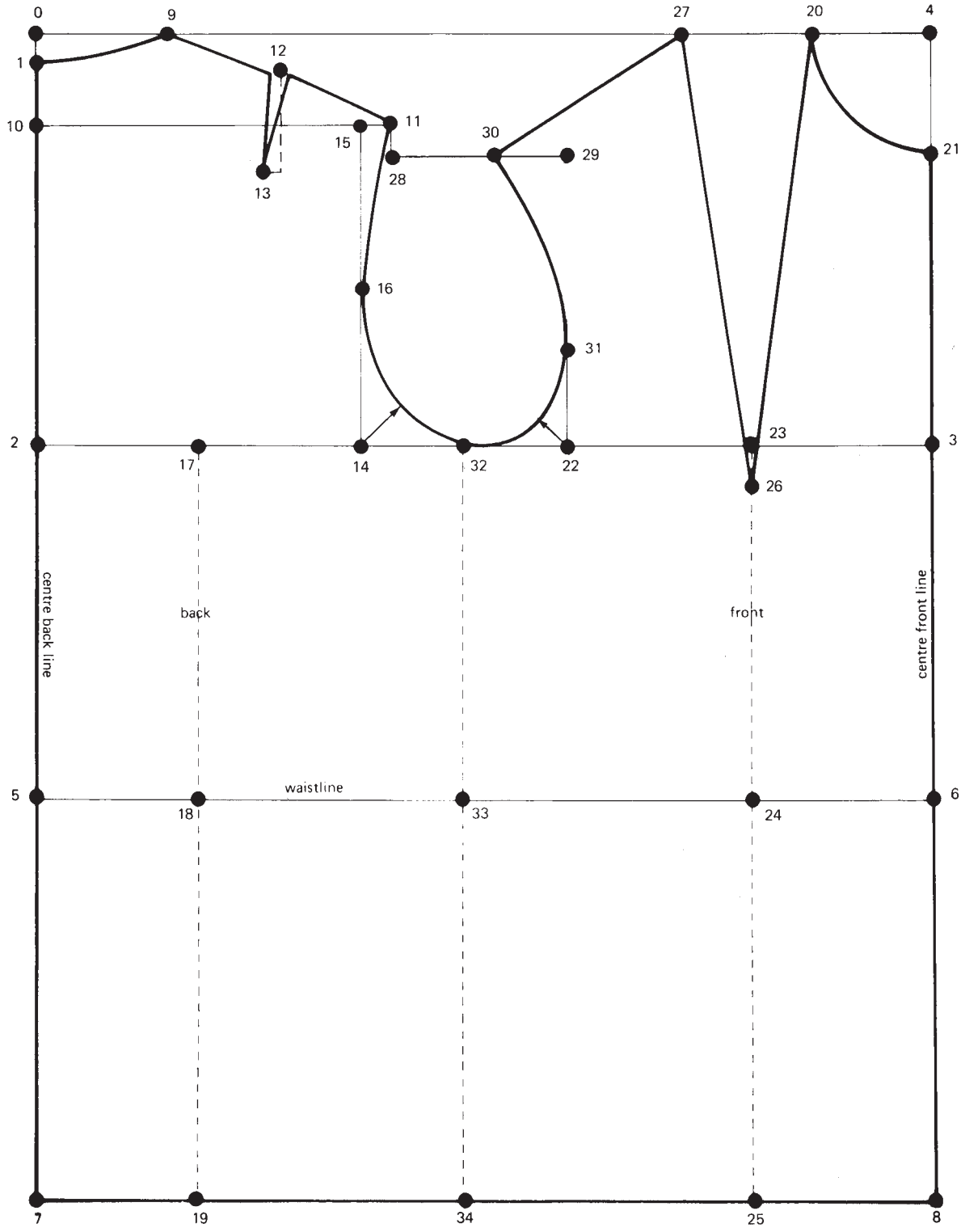
Front

4–20 one fifth neck size minus 0.7 cm.
4–21 one fifth neck size minus 0.2 cm; draw in front neck curve 20–21.
3–22 half chest measurement plus half width of dart; square up.
3–23 half the measurement 3–22; square down with a dotted line to point 24 on waistline and 25 on hipline.
26 is the bust point 2.5 cm down from 23; draw a line joining 20–26.
20–27 dart width measurement; draw a line joining 26–27.
11–28 1.5 cm; square out approx. 10 cm to 29.
27–30 draw a line from 27, shoulder length measurement, to touch the line from 28–29.
22–31 one third the measurement 3–21.
32 is midway between 14 and 22; square down with a dotted line to point 33 on the waistline and point 34 on the hipline.
Draw armscye as shown on diagram, touching points 11, 16, 32, 31, 30; measurement of the curves:

sizes	6–8	from 14	2.25 cm	from 22	1.75 cm
sizes	10–14	from 14	2.5 cm	from 22	2 cm
sizes	16–20	from 14	3 cm	from 22	2.5 cm
sizes	22–26	from 14	3.5 cm	from 22	3 cm

Draw round the outer edge of the shape from 1–21 to complete the block. When shoulder seams are joined it is essential that the neck and armscyes are smooth curves.

Sleeve Draft a one-piece sleeve (page 24) or a two-piece sleeve (page 26) to fit the armscye measurement.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centre back line
back
front
centre front line
5
waistline
6
18
33
24
7
19
34
25
8

The easy fitting bodice block

For easy fitting dress styles and easy fitting raglan and kimono shapes.

Measurements required to draft the block

Measurements from any of the size charts in this book (pages 12–14) or personal measurements (see page 178) can be applied to the block.
A size 12 from the size chart on page 12 (for fashion garments) is used for this illustrated example.

bust	88 cm	shoulder	12.25 cm
nape to waist	41 cm	back width	34.4 cm
waist to hip	20.6 cm	dart	7 cm
armscye depth	21 cm	chest	32.4 cm
neck size	37 cm		

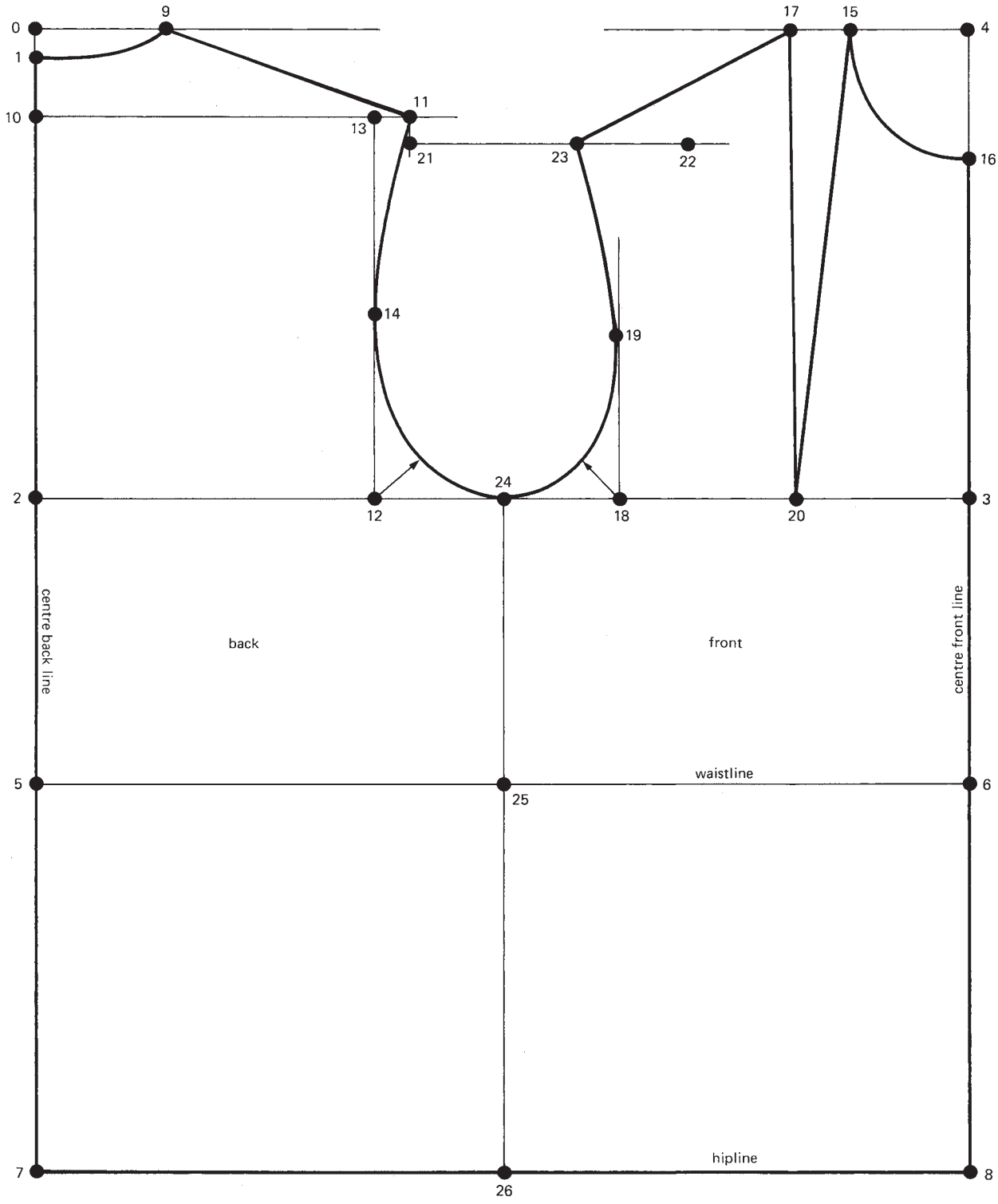
Square down from 0; square halfway across the block.
0–1 1.5 cm.
1–2 armscye depth measurement plus 2.5 cm; square across.
2–3 half bust plus 7 cm [i.e. for 88 cm bust: (88 ÷ 2) + 7 = 51]. Square up and down; mark this line the centre front line.
3–4 = 0–2
When using body sizes from the standard body measurement chart (page 13) or personal measurements (page 178):
Add an extra 0.5 cm for each size up above size 14. Example for size 20: **3–4** = 0–2 plus 1.5 cm.
1–5 nape to waist measurement; square across to 6.
5–7 waist to hip measurement; square across to 8.

Back
0–9 one fifth neck size minus 0.2 cm; draw in back neck curve 1–9.
1–10 one fifth armscye depth measurement minus 1 cm; square halfway across the block.
9–11 shoulder length measurement plus 1 cm (0.5 cm ease and 0.5 cm extra length). Draw back shoulder line to touch the line from 10.
2–12 half back width measurement plus 1 cm ease; square up to 13.
12–14 half the measurement 12–13.

Front
4–15 one fifth neck size minus 0.7 cm.
4–16 one fifth neck size minus 0.2 cm; draw in front neck curve 15–16.
15–17 half the standard dart measurement.
3–18 half chest measurement plus 1 cm, plus half the measurement 15–17; square up.
18–19 half the measurement 3–16 minus 2 cm.
3–20 half the measurement 3–18; join 15–20 and 17–20 to form a dart.
11–21 1.5 cm; square out 15 cm to 22.
17–23 draw a line from 17, shoulder length measurement plus 0.5 cm, to touch the line from 21–22.
18–24 half the measurement 12–18; square down to point 25 on the waistline and 26 on the hipline.
Draw armscye as shown on diagram, touching points 11, 14, 24, 19, 23; measurement of the curves:

sizes	6–8	from 12	2.25 cm	from 18	2 cm
sizes	10–14	from 12	2.5 cm	from 18	2.25 cm
sizes	16–20	from 12	3 cm	from 18	2.75 cm
sizes	22–26	from 12	3.5 cm	from 18	3.25 cm

Sleeve Draft a one-piece sleeve (page 24) or a two-piece sleeve (page 26) to fit the armscye measurement.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centre front line
waistline
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6
7
26
hipline
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The tailored jacket blocks

For jackets with collars and revers. Close fitting and easy fitting shapes.

Measurements required to draft the block

Measurements from any of the size charts in this book (pages 12–14) or personal measurements (see page 178) can be applied to the block.
A size 12 from the size chart on page 12 (for fashion garments) is used for this illustrated example.

bust	88 cm	shoulder	12.25 cm
nape to waist	41 cm	back width	34.4 cm
waist to hip	20.6 cm	dart	7 cm
armscye depth	21 cm	chest	32.4 cm
neck size	37 cm		

Important note The easy fitting block has a reduced dart for less bust shaping. Reduce the standard dart measurement by half. The instructions for the easy fitting block are shown in brackets.

Square down from 0; square halfway across the block.
0–1 1.75 cm.
1–2 neck to waist; square across.
1–3 finished length; square across.
2–4 waist to hip; square across.
1–5 armscye depth plus 3 cm (5 cm); square across.
1–6 half the measurement 1–5; square out.
1–7 quarter armscye depth measurement; square out.
5–8 half back width plus 1 cm (3 cm); square up to 9 and 10.
10–11 2 cm; square out.
0–12 one fifth neck size (plus 0.3 cm); draw neck curve.
12–13 shoulder length plus 1.5 cm (3 cm). These measurements include shoulder ease of 0.5 cm.
5–14 half bust plus 8 cm (12 cm); square up, square down to 15 and 16.
14–17 = 0–2
When using body sizes from the standard body measurement chart (page 13) or personal measurements (page 178):
Add an extra 0.5 cm for each size up above size 14.
Example for size 20: **14–17** = 0–2 plus 1.5 cm.
17–18 one fifth neck size plus 1 cm (2 cm).
17–19 one fifth neck size; draw in neck curve. Join point 18 to point 10.
18–20 shoulder measurement plus dart allowance plus 0.5 cm (plus reduced dart allowance plus 2 cm).
18–21 one third shoulder measurement.
21–22 dart measurement (half dart measurement).
14–23 half chest plus half the measurement 21–22 plus 1 cm (3.5 cm). Square up.
23–24 one third the measurement 14–19.
23–25 half the measurement 14–23; square down to 26 and 27 (square up 2 cm for bust point 25).
Join 21–25 and 22–25; ensure that the dart lines are the same length. Re-mark point 22.
20–28 2 cm; join 28–22 with a curve.
23–29 half the measurement 8–23; square down to 30 and 31.
Draw armscye as shown in diagram touching points 13, 9, 29, 24, 28; measurement of the curves:

		from 8	from 23
sizes	6–8	2 cm (2.75 cm)	1.5 cm (2.5 cm)
sizes	10–14	2.25 cm (3 cm)	1.75 cm (2.75 cm)
sizes	16–20	2.75 cm (3.5 cm)	2.25 cm (3.25 cm)
sizes	22–26	3.25 cm (4 cm)	2.75 cm (3.75 cm)

Sleeve Draft a two-piece sleeve (page 26).

Classic front edge shaping

Add required button stand.
Mark points 32 and 33 on waistline and hemline.
33–34 1 cm; join 31–34 with a curve.
32–35 one third the measurement 32–34.
34–36 one fifth the measurement 31–34; draw in front curve.

Shaping the blocks

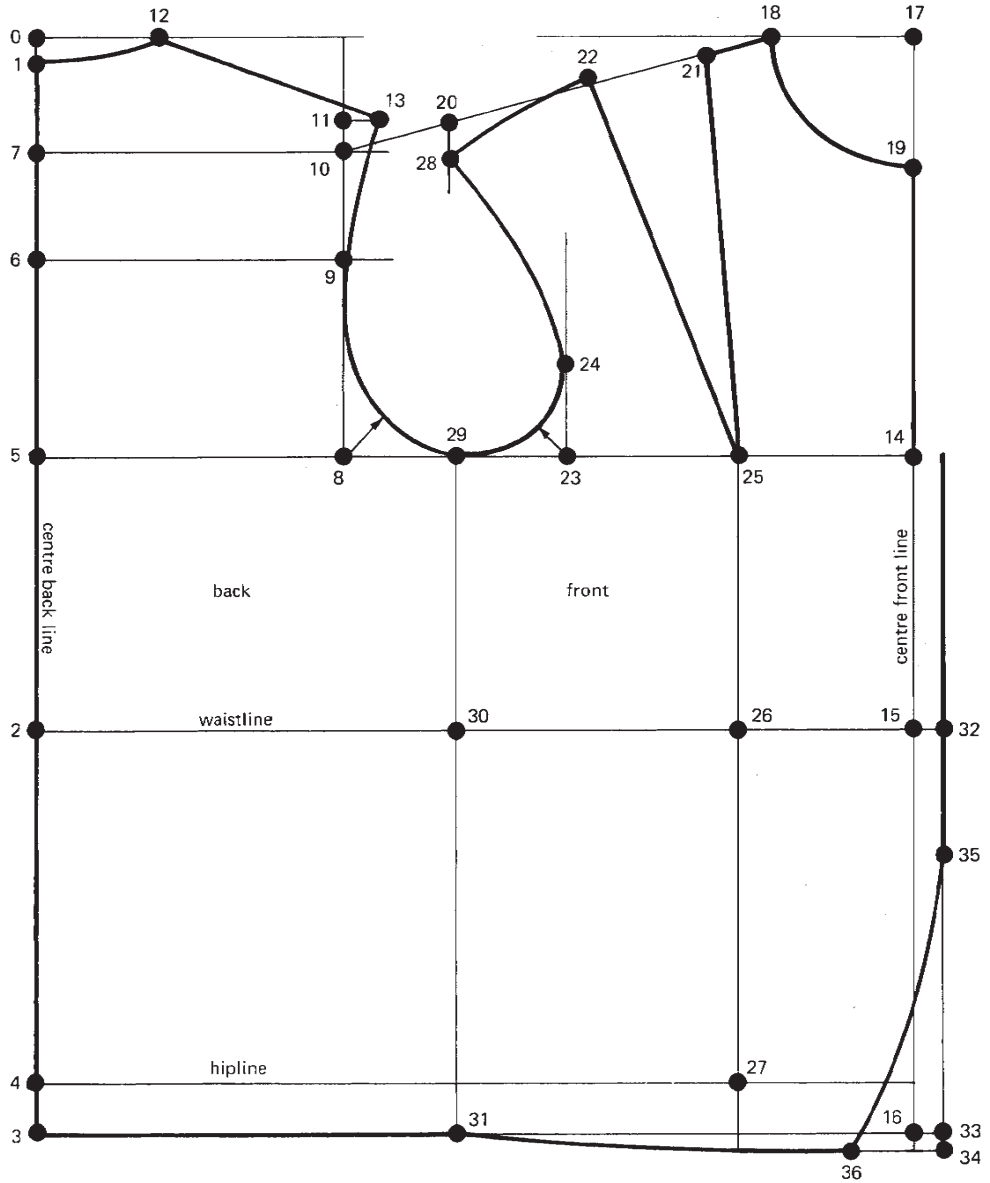
The design of the garment will determine the shaping of the block. Two examples are given:

Standard shaping (fitted designs)

2–37 1.5 cm; draw a curved line from 30–37.
37–38 1.5 cm. **3–39** 0.5 cm (1 cm). Draw back seam line 6, 38, 39.
Construct back and front darts as shown; back dart is midway between 5 and 8. (Extend back and front darts to hemline shaping in 2 cm at each hem point.)
Shape back side seam: shape in back waistline 1.5 cm (2 cm); add 1.5 cm to hemline (0.5 cm).
Shape front side seam: shape in front waistline 2 cm (2.5 cm); add 1 cm to hemline (0.5 cm).

Semi-fitted shaping ('men's style')

2–37 1.5 cm. **37–38** 1 cm (1.5 cm). **3–39** 0.5 cm (1.5 cm). Draw back seam line 6, 38, 39.
8–40 quarter armscye depth minus 1 cm; square across to 41 on armscye line; square down to 42.
8–43 1.5 cm (2 cm); square down to 44 and 45.
45–46 2.5 cm; draw in back seam line through points 41, 44, 46 (45) and 41, 42, 45 (46).
29–47 one third measurement 23–29; square down to 48 on waistline and 49 12 cm below waistline. Draw in a 1 cm (2 cm) dart on this line.
25–50 3 cm. **27–51** 5 cm. Draw in 1 cm (2 cm) dart on this line (continue the 2 cm shaping to the hemline).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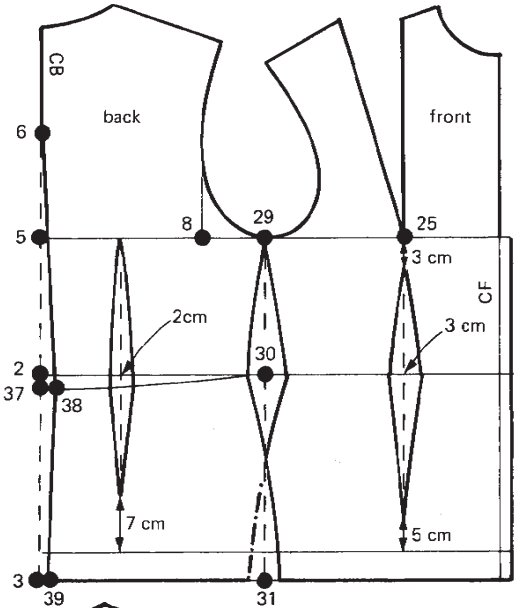
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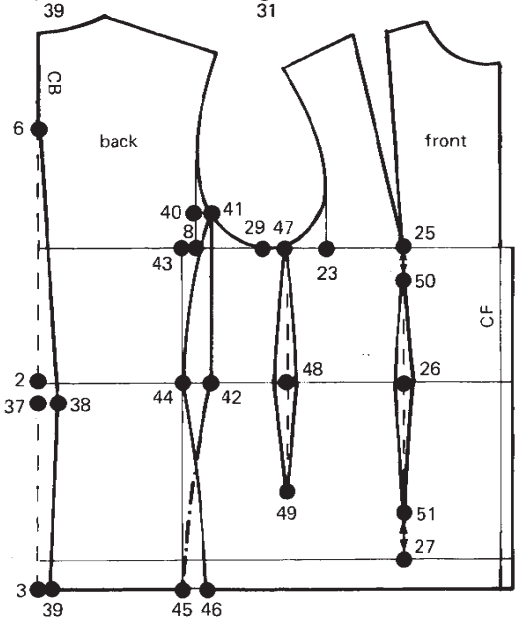
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The classic coat blocks

For close fitting coats and easy fitting overgarments.

Measurements required to draft the block

Measurements from any of the size charts in this book (pages 12–14) or personal measurements (see page 178) can be applied to the block.
A size 12 from the size chart on page 12 (for fashion garments) is used for this illustrated example.

bust	88 cm	shoulder	12.25 cm
nape to waist	41 cm	back width	34.4 cm
waist to hip	20.6 cm	dart	7 cm
armscye depth	21 cm	chest	32.4 cm
neck size	37 cm		

Important note The easy fitting block has a reduced dart for less bust shaping. Reduce the standard dart measurement by half. The instructions for the easy fitting block are shown in brackets.

Square down from 0; square halfway across the block.
0–1 2 cm.
1–2 armscye depth plus 4 cm (6 cm); square across.
2–3 half bust plus 10 cm (15 cm) [i.e. for 88 cm bust; (88 ÷ 2) + 10 = 54 cm]. Square up and down, mark this line the centre front line.
3–4 = 0–2
When using body sizes from the standard body measurement chart (page 13) or personal measurements (page 178):
Add an extra 0.5 cm for each size up above size 14. Example for size 20: **3–4** = 0–2 plus 1.5 cm.
1–5 nape to waist measurement plus 0.5 cm; square across to 6.
5–7 waist to hip measurement; square across to 8.

Back

0–9 one fifth neck size plus 0.4 cm (0.8 cm); draw in back neck curve 1–9.
2–10 half the measurement 1–2; square out.
1–11 quarter armscye depth measurement; square out.
2–12 half back width plus 1.5 cm (4 cm); square up to 13 and 14.
14–15 2 cm; square out.
9–16 shoulder measurement plus 2 cm (3.5 cm). These measurements include shoulder ease of 0.5 cm.

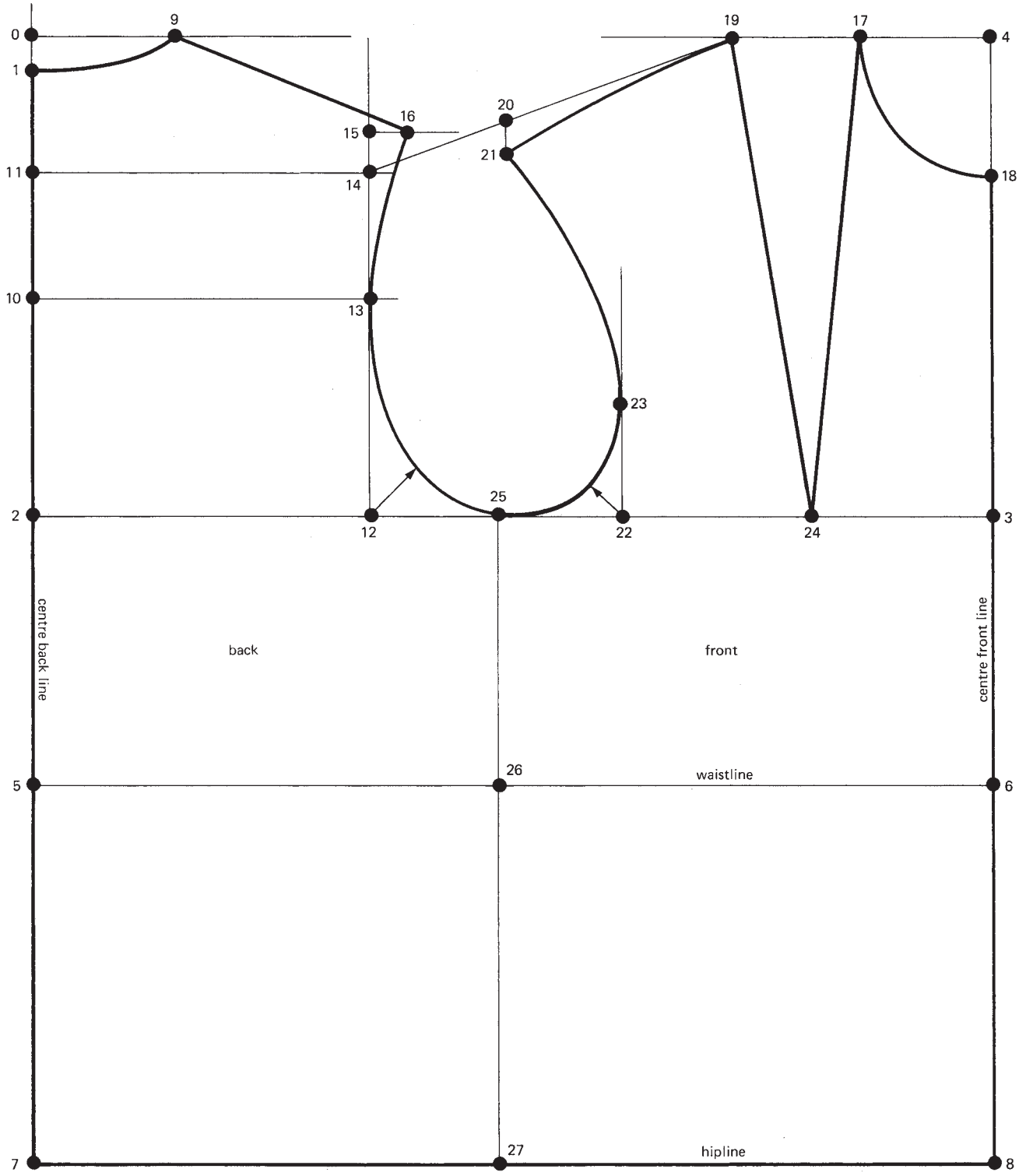
Front

4–17 one fifth neck size plus 0.2 cm (0.6 cm).
4–18 one fifth neck size plus 0.3 cm; draw in front neck curve 17–18.
17–19 dart measurement (half dart measurement). Joint point 19 to point 14.
19–20 the measurement 9–16 minus 1 cm.
20–21 1.5 cm (1 cm); join 19–21 with a slight curve.
3–22 half chest plus half the measurement 17–19 plus 1 cm (4 cm). Square up.
22–23 one third the measurement 3–18.
22–24 half the measurement 3–22 (square up 3 cm to mark bust point). Join 17–24 and 19–24 to form dart.
22–25 half the measurement 12–22; square down to 26 and 27.
Draw armscye as shown in diagram touching points 16, 13, 25, 23, 21; measurement of the curves:

		from 12	from 22
sizes	6–8	2.5 cm (3 cm)	2 cm (2.5 cm)
sizes	10–14	2.75 cm (3.25 cm)	2.25 cm (2.75 cm)
sizes	16–20	3.25 cm (3.75 cm)	2.75 cm (3.25 cm)
sizes	22–26	3.75 cm (4.35 cm)	3.25 cm (3.75 cm)

Note For simple shapes (i.e. kimono block) for mass production, equalise the side seam by making:
2–25 half the measurement 2–3; square down to point 26 on the waistline and 27 on the hipline.

Sleeve Draft the one-piece sleeve (page 24) or a two-piece sleeve (page 26) to fit armscye.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back
front
centre front line
26
waistline
5
6
27
hipline
7
8

The one-piece sleeve block

Measurements required to draft the block

Measurements from any of the size charts in this book (pages 12–14) or personal measurements (see page 178) can be applied to the block.
A size 12 from the size chart on page 12 (for fashion garments) is used for this illustrated example.

armscye	measure the armscye
sleeve length	58.5 cm

For coats and easy fitting jackets add 1.5 cm to sleeve length.

Draw a perpendicular line from the armscye line at 1 touching the front armscye.
1–2 one third armscye measurement (sizes 8–14 minus 0.5 cm, sizes 16–22 minus 0.3 cm); square across.
3 midway between 1 and 2; square across to 4 on the back scye line; mark balance point; continue line.
1–5 half the measurement 1–3; mark front balance point as shown. Mark adjacent armscye point 5A with balance point.
6 front shoulder point.
5–7 the measurement of the curve 5A–6 plus 1 cm (plus 1.25 cm sizes 16–20; plus 1.5 cm sizes 22–26); join with a line. Mark top sleeve balance point at 7.
8 back shoulder point.
7–9 the measurement of the curve 4–8 plus 1 cm (plus 1.25 cm sizes 16–20; plus 1.5 cm sizes 22–26); join with a line. Mark back sleeve balance point at 9.
10 the underarm point on the side seam; mark with a balance point.
5–11 the measurement of the curve 5A–10 less 0.3 cm; join with a line.
9–12 the measurement of the curve 4–10 less 0.3 cm; join with a line.
Square down from 7.
7–13 sleeve length to wrist; square across both ways for wrist line.
Square down from 11 and 12 to wrist line to marl points 14 and 15.

Draw in outline of sleeve head:
12–9 hollow the curve 0.75 cm.
9–7 raise the curve 1 cm.
7–5 raise the curve 2 cm at x (one third of distance 7–5).
5–11 hollow the curve 1 cm.

Draw in line of wrist:
14–13 lower the curve 1 cm.
13–15 hollow the curve 1 cm.
For slight sleeve shaping narrow sleeve at wrist 3–5 cm.
The elbow line is on the waistline of the block.

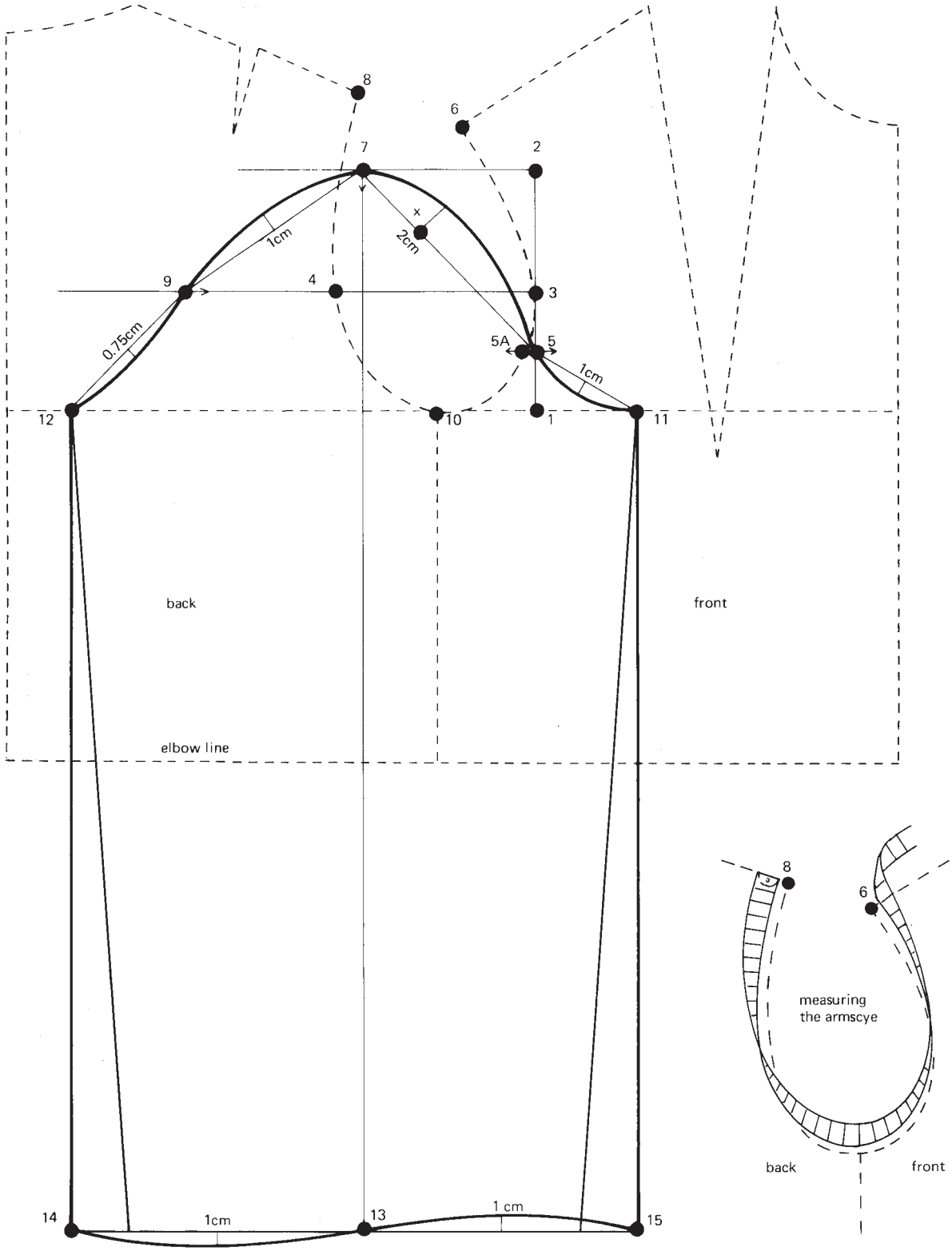
Note It is important that all 'curved measurements' are measured very accurately along the curved line. The sleeve is based on the body blocks to ensure a perfect fit at the armscye.

Ease at the sleeve head

The ease in the sleeve head is drafted to give a full rounded appearance to the sleeve head. For a flatter insertion reduce the ease allowance in the draft; see notes 5–7 and 7–9.

Padded shoulders

All the blocks and sleeves have no allowance included in the draft for shoulder pads. If pads are required refer to the section 'Padded shoulders' (ref. 8 page 50).


8
6
7
2
x
1cm
2cm
9
4
3
0.75cm
5A
5
1cm
12
10
1
11
back
front
elbow line
14
1cm
13
1 cm
15
8
6
measuring
the armscye
back
front

The two-piece sleeve block

Measurements required to draft the block

Measurements from any of the size charts in this book (pages 12–14) or personal measurements (see page 178) can be applied to the block.
A size 12 from the size chart on page 12 (for fashion garments) is used for this illustrated example.

armscye	measure the armscye
sleeve length to wrist	58.5 cm
cuff size	13.75 cm

For coats and easy fitting jackets add 1.5 cm to sleeve length and 1 cm to cuff size.

Mark basic points on body block.
Mark point A at underarm, B and C at shoulder points.
Mark points D and E at base of lines which are squared up to touch the armscye curves.

Sleeve

Square up and across from 0.
0–1 one third armscye measurement; square across.
1–2 one third measurement 0–1 plus 1 cm; square across.
0–3 quarter the measurement 0–1.

On body block E–F equals measurement 0–3 on sleeve block.
Square out to FP (front pitch point) on armscye.
D–BP (back pitch point) equals the measurement 0–2 on sleeve block.

3–4 the measurement of the curve C–FP plus 1 cm (plus 1.25 cm sizes 16–22; plus 1.5 cm sizes 24–30). Join 3–4.
4–5 the measurement of the curve B–BP plus 0.8 cm (plus 1 cm sizes 16–22; plus 1.2 cm sizes 24–30). Join 4–5.
0–6 the measurement A–E on body block.
0–7 2 cm; square across both ways.
7–8 and **7–9** 2 cm; square down from 8 and 9.
1–10 sleeve length to wrist; square across to 11 and 12.
10–13 3 cm; square across.
10–14 cuff size for two-piece sleeve; join 10–14 and 10–11.
7–15 half the measurement 7–10; square across (elbow line). Curve inner sleeve seams inwards 2 cm at elbow line (1 cm on easy fitting sleeves).
Draw in sleeve head.
5–4 raise the curve 1 cm.
Mark point 16; 4–16 is one third the measurement 4–3.
4–3 raise the curve at 16 2 cm; join 3–8 with a curve.
6–17 the measurement A–BP on body block, measured straight, plus 0.5 cm.
Join 6–17, draw a curve hollowed 1.5 cm.
Join 6–9 with a slight curve.
Join 17–14 and 5–14.
Mark points 18 and 19 on elbow line.
Curve outer sleeve seams outwards 2.3 cm (2.5 cm sizes 16–20; 2.7 cm sizes 22–26) at 18 and 19.

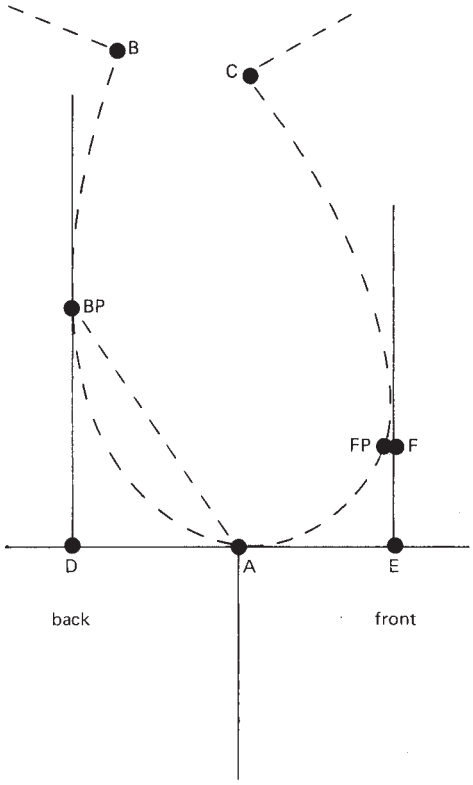
Note It is important that all 'curved measurements' are measured very accurately along the curved lines with the tape upright (see diagram).

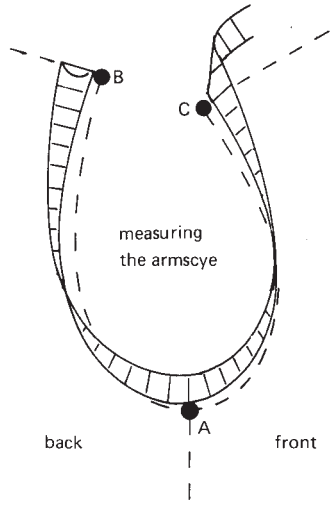
Ease at the sleeve head

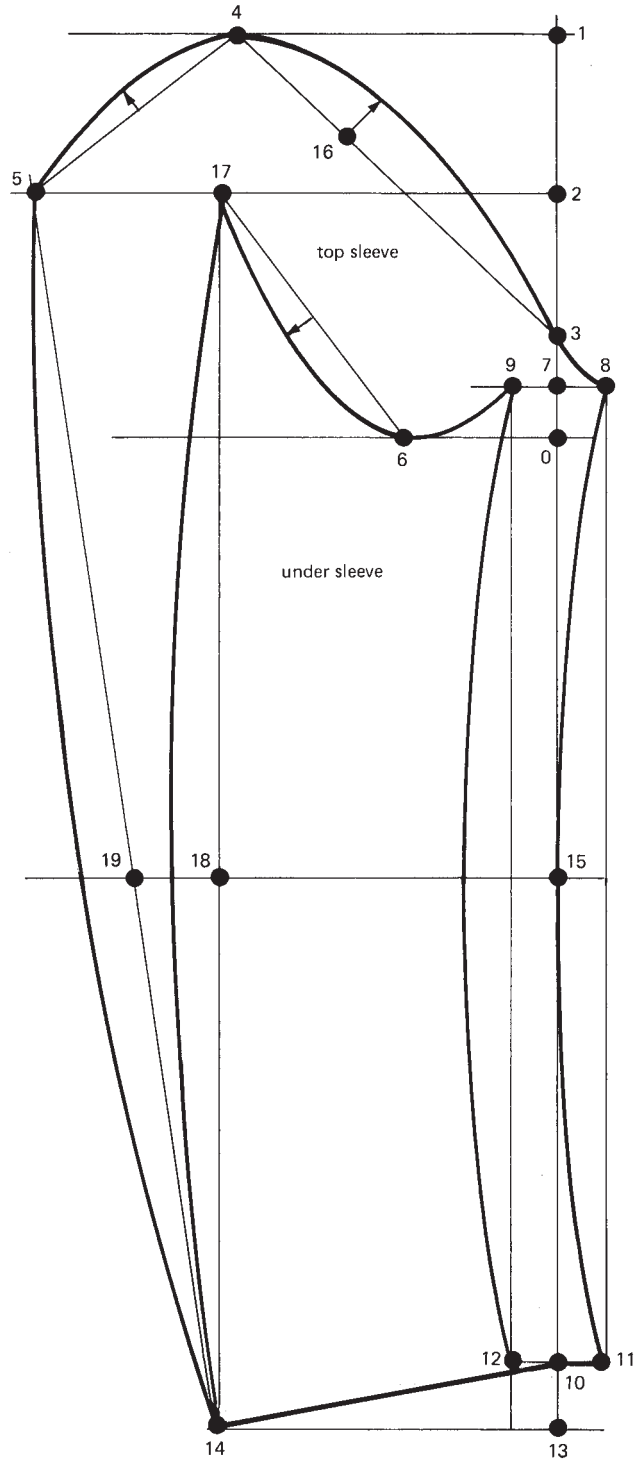
The ease in the sleeve head is drafted to give a full rounded appearance to the sleeve head. For a flatter insertion reduce the ease allowance in the draft; see notes 3–4 and 4–5.

Padded shoulders

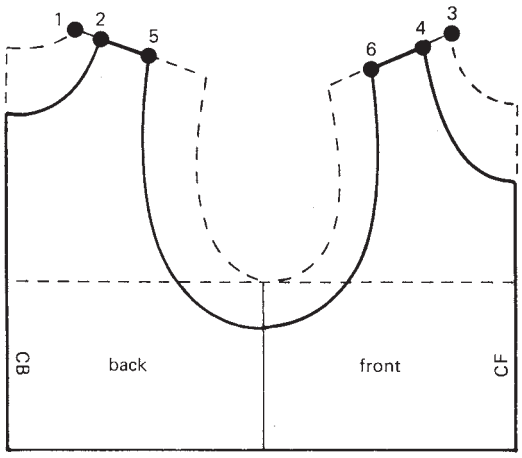
All the blocks and sleeves have no allowance included in the draft for shoulder pads. If pads are required refer to the section 'Padded shoulders' (ref. 8 page 50).


B
C
BP
FP
F
D
A
E
back
front


B
C
measuring
the armscye
A
back
front


4
1
16
5
17
2
top sleeve
3
9
7
8
6
0
under sleeve
19
18
15
12
11
10
14
13

The sleeveless blocks



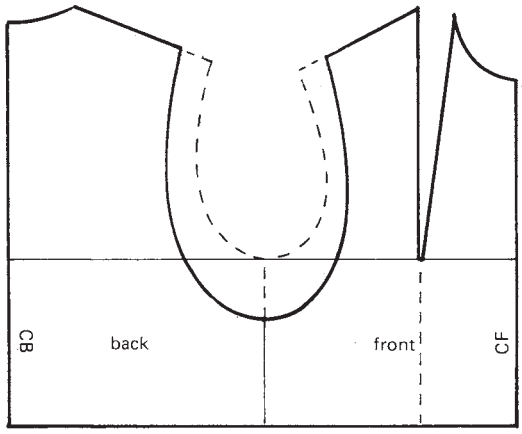
It is a simple matter to draw new armscye shapes onto a block or adapted pattern. If a wider finished shape is required, open the underarm seam the required amount before starting the armscye adaptation.

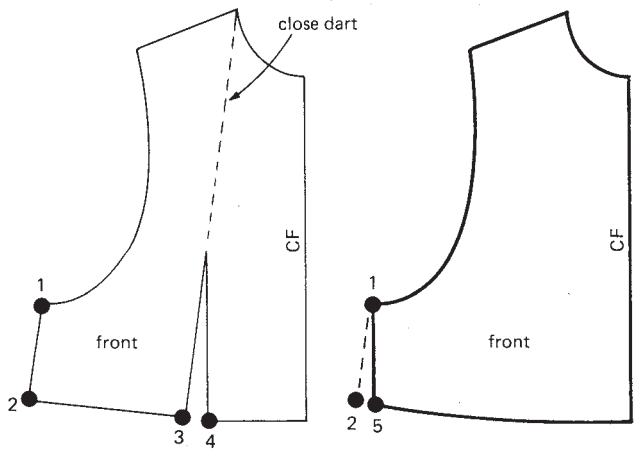
1 Simple singlet shapes

Use the dartless block adaptation shown below for woven fabrics, the knitwear or tee shirt blocks for jersey fabrics.
Make 1–2 and 3–4 the same measurement; draw in neck.
Make 2–5 and 4–6 the same measurement; draw in armscye.

2 Dart transfer

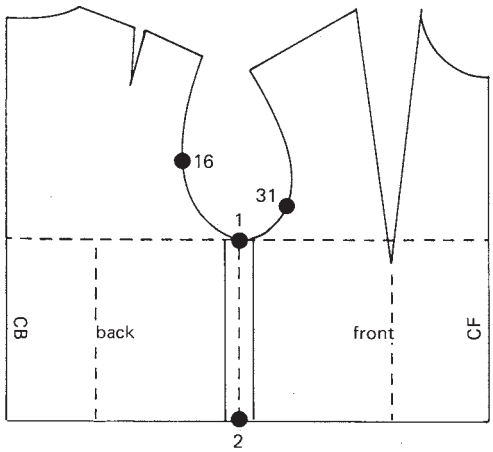
Trace block required with reduced bust darting.
If lowered armscye is required draw in armscye shape.
Drop a vertical line from base of bust dart.
Cut up line; close bust dart. Mark points 1, 2, 3, 4.
2–5 is the measurement 3–4. Draw new side seam 1–5.



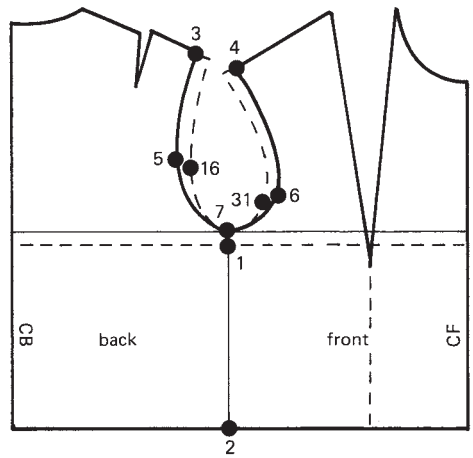


3 The close fitting sleeveless block

Trace the close fitting bodice block. Mark points 16 and 31. Mark side seam 1–2.
Draw new side seam lines 1.5 cm each side of 1–2.
Cut round bodice pieces; rejoin the side seam 1–2.

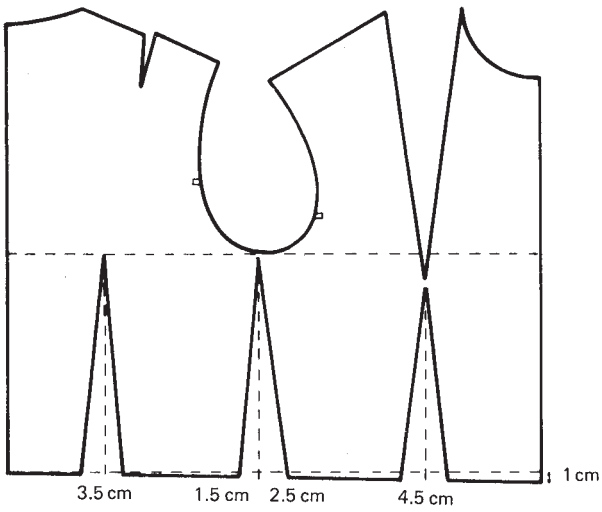


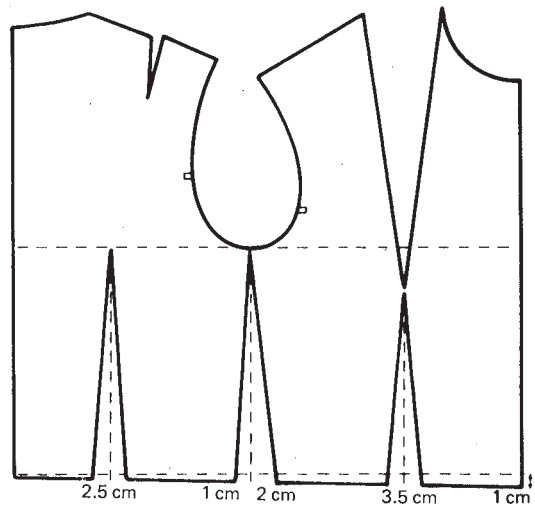
Draw new armscye depth line 1 cm above original line.
Mark points 3 and 4 1 cm in from shoulder edge.
Mark points 5 and 6 1 cm in and 1 cm up from 16 and 31.
1–7 1 cm. Draw new armscye using points 3, 5, 7, 6, 4.



Shaping the waist

All waisted garments require front waist dropped 1 cm (1.5 cm–2 cm large sizes); join to back with curved line.



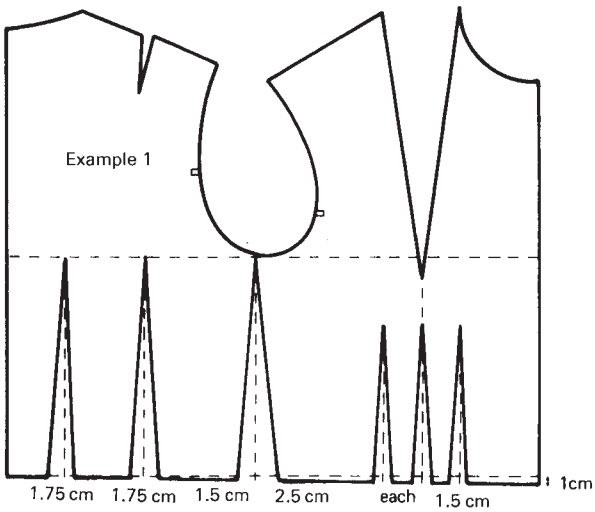


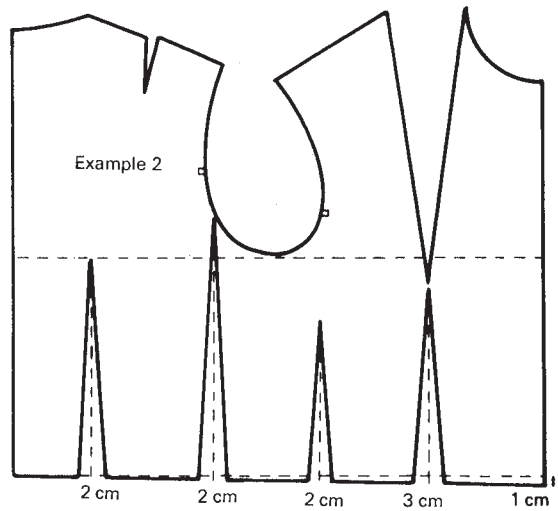
Classic waist shaping

Shaping the waist of the close fitting block requires half the waist measurement plus 3 cm ease. This means 12 cm shaping (all sizes). Shape block on the dotted lines: 3.5 cm at back dart, 1.5 cm at back side seam, 2.5 cm at front side seam, 4.5 cm at front dart.

The close fitting sleeveless block

The sleeveless block has already been reduced by 3 cm. This means 9 cm shaping (all sizes). For classic waist shaping follow the dotted lines: 2.5 cm at back dart, 1 cm at back side seam, 2 cm at front side seam, 3.5 cm at front dart.





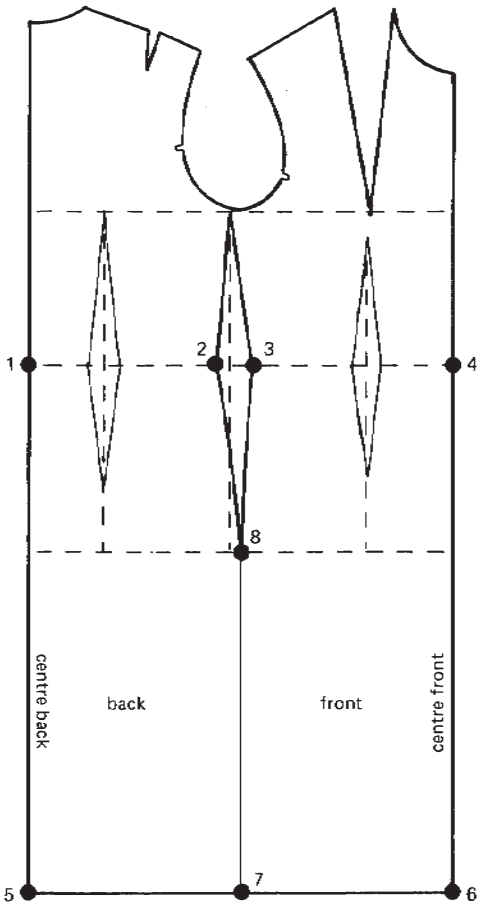
Examples of alternative waist shaping

The waist shaping can be distributed in different ways depending on the design or block used.

The shaping can be reduced if less fitted styles are required.

Example 1 A design showing the shaping of 12 cm distributed into more darts.

Example 2 Design showing the elimination of the side seam and an easy fitting shape. Waist reduced only 9 cm.



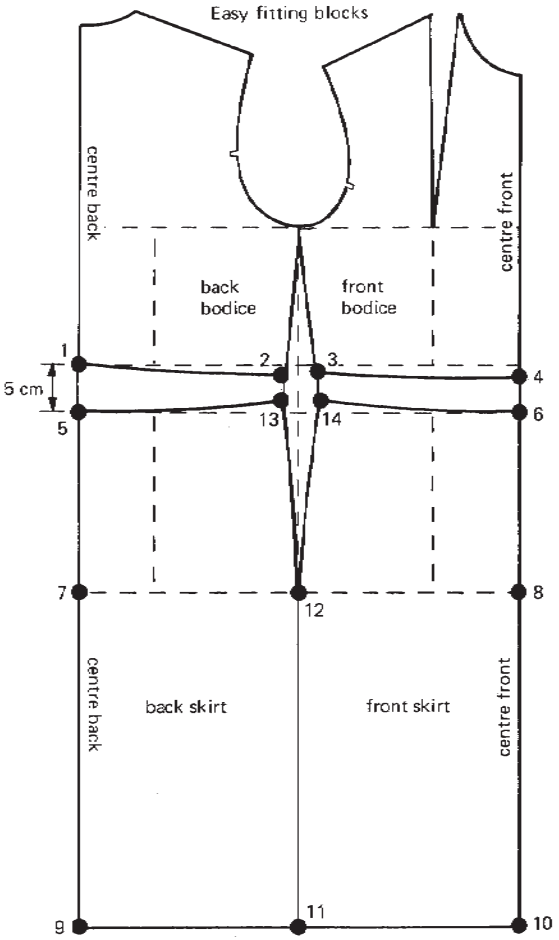
One-piece dress blocks

Dress blocks without waist shaping

Extend block to finished length; square across.

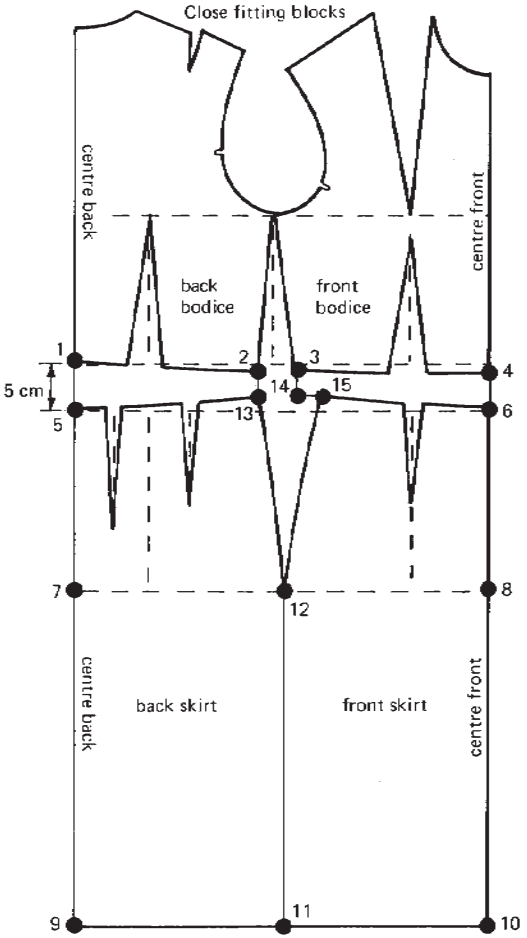
Close fitting dress block

Trace close fitting bodice block to hipline; draw classic waist shaping. Mark 1, 2, 3, 4. Square down from 1 and 4 to 5 and 6. Square across. 7 is midway 5–6; square up to 8. Join 3–8 and 2–8 with curved lines. Extend back and front darts 13 cm.



Two-piece dress blocks

Trace chosen bodice block. Lower front waist line 1 cm. Draw classic waist shaping on close fitting block, side seam shaping on other blocks. Mark 1, 2, 3, 4; square down from 1 and 4.
1–5 5 cm; square across to 6.
5–7 waist to hip; square across to 8.
5–9 finished length; square across to 10. 11 is midway 9–10; square up to 12. 13 and 14 are below 2 and 3 and 1.25 cm up from line 5–6.



Easy fitting blocks

Join 5–13, 13–12, 6–14, 14–12 with curved lines.

Close fitting blocks

14–15 2.5 cm; join 5–13, 13–12, 6–15, 15–12 with curved lines.
Back darts: construct two darts 1.75 cm wide, 12 cm and 14 cm long. Place darts each side of bodice dart squared down from line 5–13.
Front dart: construct a dart 2 cm wide and 10 cm long directly below bodice dart.

PART ONE: CLASSIC FORM CUTTING

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Lays 36

From block to pattern

Dress stands and toiles

It is possible to cut out patterns without a dress stand. Many people who sew for pleasure do not have one. However, they are a very valuable piece of equipment. Students should combine flat pattern cutting with work on the dress stand. Design ideas that look acceptable on a flat piece of paper can look ugly and distorted on the rounded form of the body or the dress stand. If a dress stand is not available, you can use the figure of a colleague or your own body. The making of calico toiles is essential when designing advanced styles. A design toile is the pattern cut out in calico and made up to check and perfect the design. Drapes and intricate cuts can be worked on the stand before the toile is sewn.

When the toile is made up, it should be seen on a moving figure to consider the proportions and to ensure the correct amount of ease has been allowed.

The pattern

Three different types of pattern are used by designers when drafting patterns. It is necessary to know the difference.

The block pattern is the basic pattern that is used as a basis for all adaptations. The block pattern is traced or 'wheeled' onto pattern paper to produce the working pattern.

The working pattern is used for marking out the basic style lines and design features (e.g. pockets, collars, buttonhole placings). Pattern sections are traced off and may be further adapted. Complicated styles may need a number of trials at this stage.

The final pattern is the pattern from which the garment will be cut. It must be clearly marked with all the information required for making up the garment.

Before commencing any adaptation the following points should be considered:

(1) Choose the correct blocks (e.g. if a baggy trouser style is required, use an easy fitting trouser block).
(2) Decide the length; lengthen or shorten the block.
(3) Decide if any easy fitting armscye is required (see lowered armscye ref. 23 page 56).

Good lines and curves

Refer to the diagrams on the page opposite.

When drafting patterns it is essential that lines and curves are smooth, as any uneven lines will show as unsightly bumps on the finished garment.

1 When a curved line meets a straight line it must run into it smoothly.
2 Neck and armscye curves must be perfect. Make sure all design curves are beautifully shaped, especially where they meet a fold line. French curves are very useful for drawing curved lines.
3 Pattern pieces that are 'cut and spread' can give an uneven outline. Draw it as a smooth, even line.
4 When a dart is machined the base of the dart is drawn upwards; this creates a 'V' shape. Compensate for this by shaping the base of the dart downwards on the seam (4).

Close fitting bodice – darts and seams

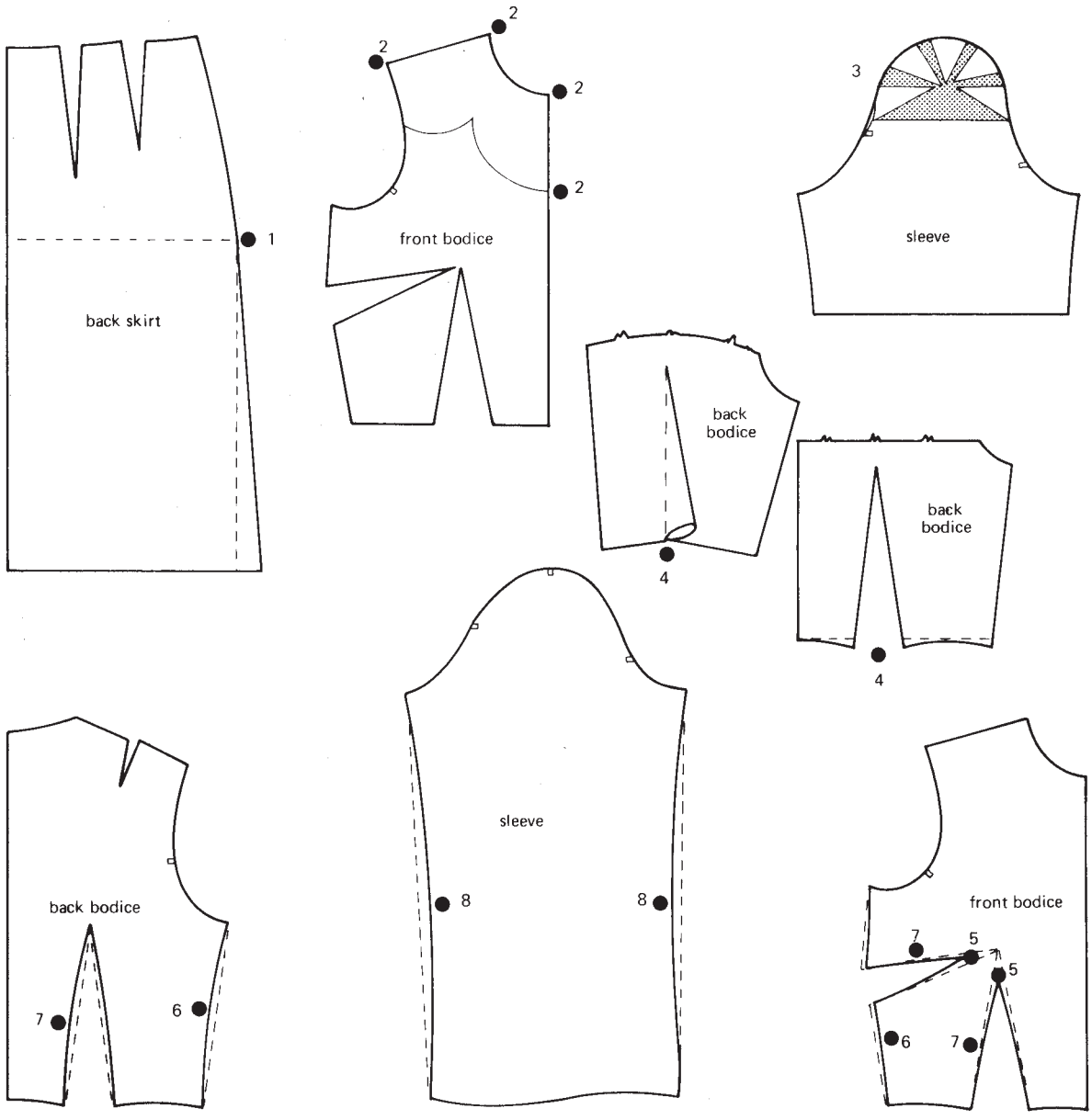
When the working pattern is completed, the darts and seams of a close fitting bodice can be shaped to give a better fit. However, in most mass production patterns, the seam and dart lines remain straight.
5 To avoid sharp points at the bust shorten the length of the bust dart and front waist dart by 2 cm.
6 and **7** To achieve a fitted shape around the diaphragm, curve the side seam slightly inwards (6) and the bust and waist darts slightly outwards (7 and 8). This method can be used on the side seam of the sleeve (8).
Do not use this method on skirt darts.
Do not overshape (maximum 0.3 cm darts, 0.5 cm side and sleeve seams).

Principles of pattern making

The following chapters cover pattern adaptations, manipulating the block to make different designs. Basic principles are common to many pattern pieces; these should be considered before one begins.

Seam lines A pattern piece can be cut across vertically, horizontally, diagonally, with curved lines etc. When the sections are joined the pattern piece will have a seam, but the basic shape remains the same. Dart shaping can be moved to seam lines so that the shaping remains but the dart disappears (ref. 2 page 82).

Shape A garment can fit closely to the figure, be semi-fitting or easy fitting in shape. This is achieved by using the blocks with or without shaping.
Some examples of changes of pattern shape are:
widening the outline . . . inserting extra body ease;
hidden shapes . . . adding pleats and godets;
puff and bell shapes . . . adding width to the design by tucks or gathers;
cone shapes . . . widening the hem line only.



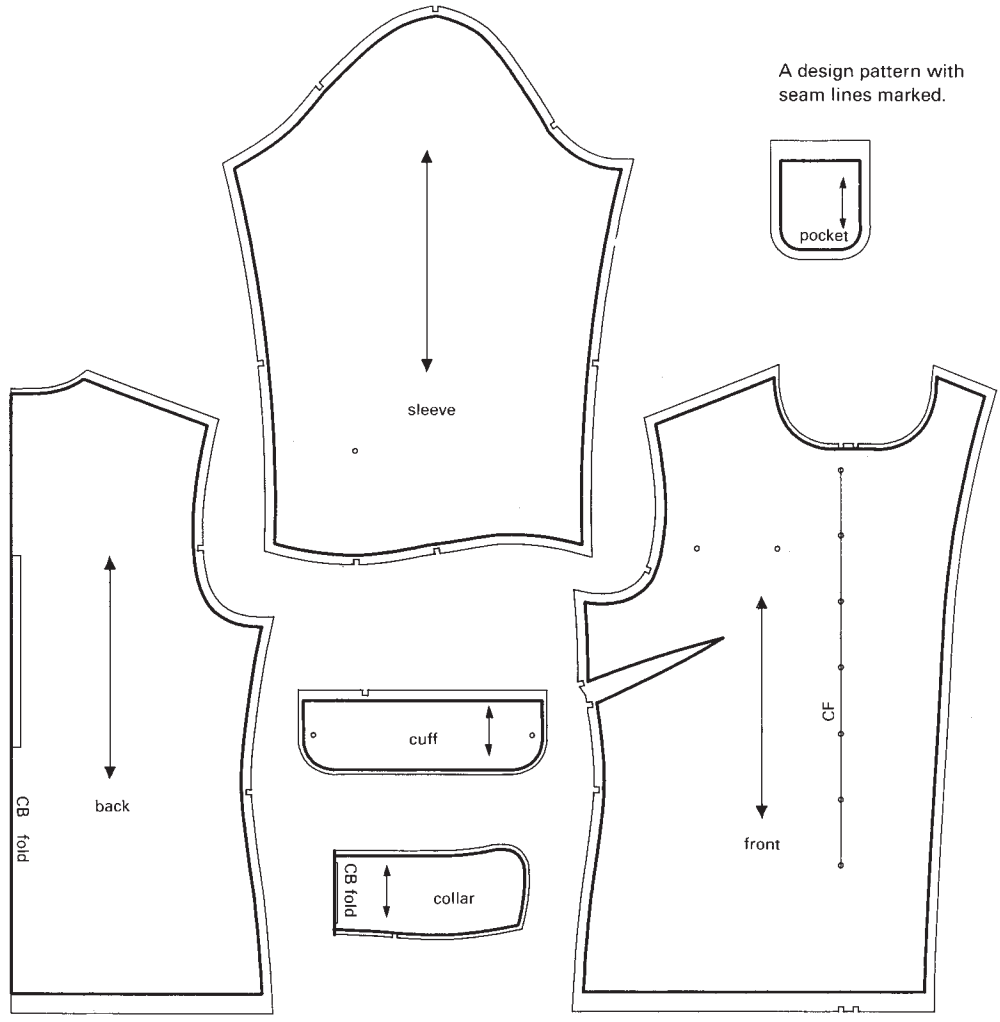
Adding pieces when adding pockets, peplums, panels, flaps, etc., consider carefully the balance of the design.

Body movement in more advanced pattern cutting parts of bodices are added to sleeves. When working these designs always be aware that the body must be able to move. It is only on wide, full garments that very simple shapes can be used.

Beautiful shapes it is always necessary to have good lines and shapes. When cutting intricate patterns small amounts of the basic block may be lost or small parts added. How much one can do this depends on one's skill and experience. That is why it is so difficult to cut the subtle shapes achieved by our top designers.

Cutting individual garments gives designers much more freedom; they are not restricted by the price limits and the fabrics used in mass production.

Seam allowances



Manufacturers require finished patterns to have seam allowances added. Some require their designers to adapt patterns from blocks that already include the seam allowance. This is a difficult task for a beginner. It is better for students to work with nett patterns (those without seam allowance); especially when drafting complicated styles. The seam allowance can be added afterwards.

Seam allowance widths vary with the type of manufacture and garment. The following examples are a general guide.

Basic seams e.g. side seams, style seams . . . 1 to 1.5 cm.

Enclosed seams e.g. collars, cuffs . . . 0.5 cm.

Hems depth depends on shape and finish . . . 1 to 5 cm.

Decorative seams usually require more seam allowance.

Fabrics that fray easily will require wider turnings especially around facings and collars.

The width of the seam allowance must be marked on the pattern by lines or notches.

No seam allowance is required on a fold line.

It is important that seam allowances added to the pattern are accurate and clearly marked.

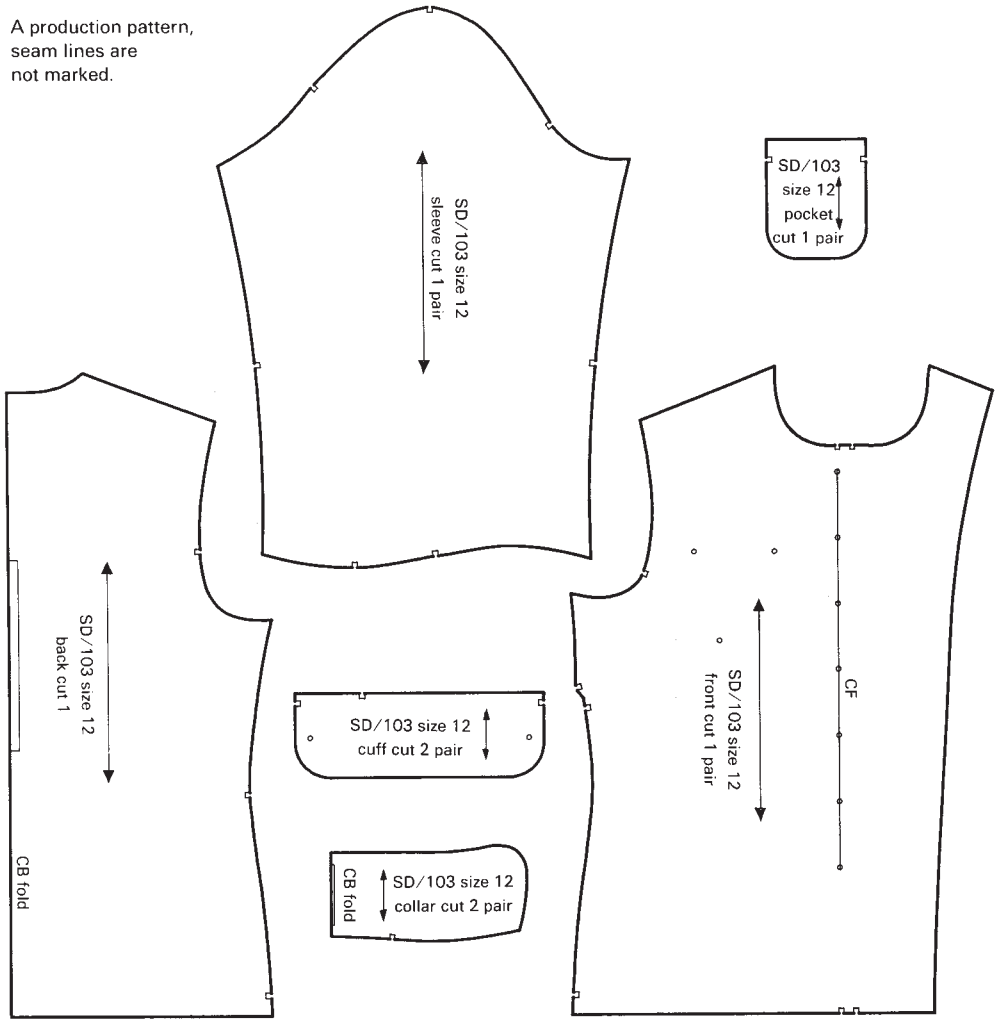
Toile patterns

It is not necessary to add seam allowances at this stage, they can be marked directly on the calico.

Industrial patterns

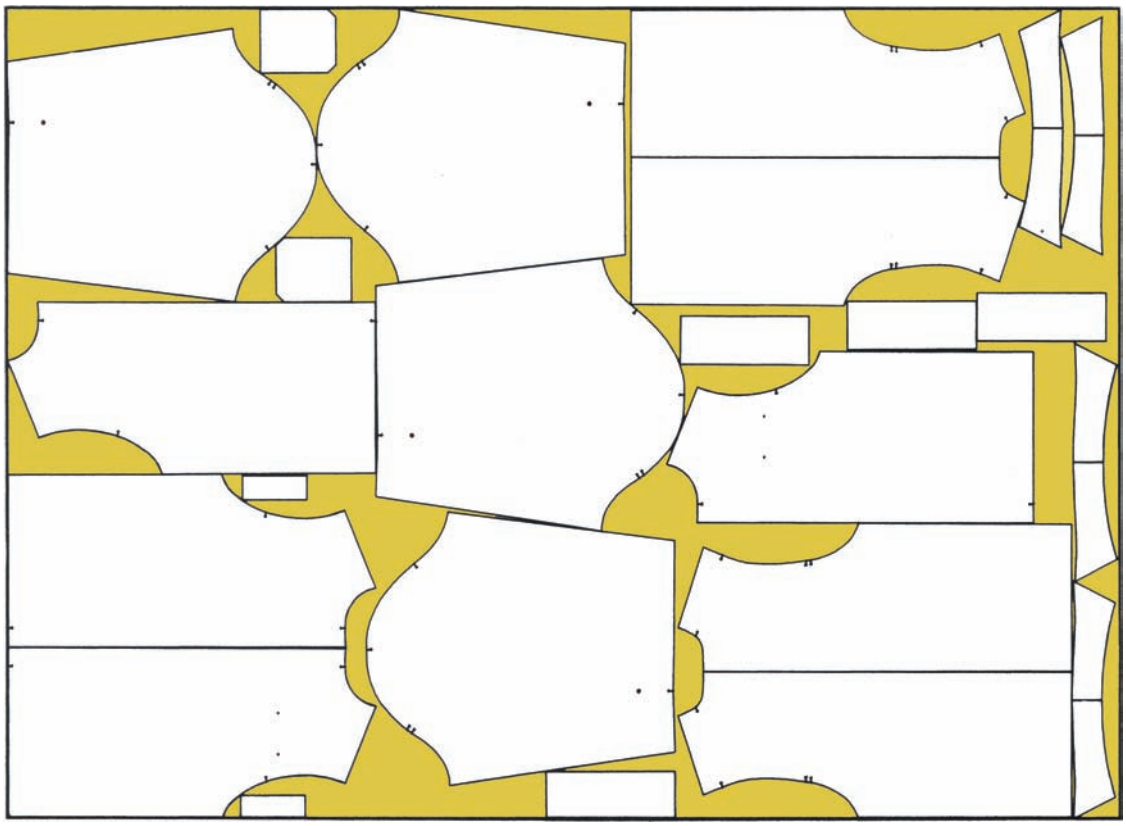
The seam lines are not marked on these patterns. The seam allowance is usually stated in the making up specification and only varying seam allowances will be marked by notches.

Pattern instructions


A production pattern, seam lines are not marked.
SD/103 size 12 sleeve cut 1 pair
SD/103 size 12 pocket cut 1 pair
SD/103 size 12 back cut 1
CB fold
SD/103 size 12 cuff cut 2 pair
CB fold
SD/103 size 12 collar cut 2 pair
SD/103 size 12 front cut 1 pair
CF

To enable the garment to be made up correctly the following instructions must be marked on the pattern:

(1) The name of each piece.
(2) Centre back and centre front.
(3) The number of pieces to be cut.
(4) Folds.
(5) Balance marks . . . these are used to make sure pattern pieces are sewn together at the correct points.
(6) Seam allowances . . . these can be marked by lines round the pattern or notches at each end of the seam. If a pattern is nett (has no seam allowance), mark this clearly on the pattern.
(7) Construction lines . . . these include darts, buttonholes, pocket placings, tucks, pleat lines, decorative stitch lines. These lines are marked on the pattern or shown by punch holes.
(8) Grain lines . . . to achieve the effect you require, you must understand the principle of placing a pattern on the correct grain of the fabric (see over page). Mark the grain line with an arrow. Mark the grain lines on the working pattern before it is cut up into sections. Once in pieces it can be difficult to find the correct grain on complicated pattern sections.
(9) Pattern size.
(10) Style no., e.g. SD/103.



A computer-generated cost lay plan with 84% efficiency.

Fabric grain

All woven fabrics have warp threads and weft threads. The warp threads run parallel to the selvedge of the fabric and are the strongest; the weft threads run across the fabric and are weaker.

It is good practice to have the vertical lines of the pattern running parallel to the warp threads. Pattern pieces can be cut on the cross for the following reasons:

Design features stripes and checks cut at different angles can produce interesting designs.

Natural stretch fabric cut on the cross has natural stretch characteristics; this allows the pattern to be cut with less ease. The design then fits the figure closely but remains comfortable.

Drape folds, drapes and softly flaring skirts hang better when cut on the cross. The effects of cutting on the cross are increased by the choice of fabrics, i.e. crepes, satins and soft woollens.

Once the grain has been decided and marked on the pattern, always check that you have laid it on the fabric correctly before cutting out, or a distorted garment will be produced.

Lays

Cost is very important, therefore economical lays are required by manufacturers. A 'lay' (or marker) is the plan of the pattern pieces as they are placed on the fabric. Fabrics that have to be cut in one direction are usually very uneconomical; fabrics that allow the pieces to be laid in both directions will reduce fabric costs. The practice of saving fabric by laying pattern pieces across the fabric or 'off the grain' should not be attempted by a beginner as this practice can ruin a garment.

When a designer submits a sample, a cost lay plan is made, usually of two garments, so that an accurate costing can be produced. This may be done in varying widths of fabric.

If more than one fabric is used in a garment, more than one lay plan will be made. The collection of pattern pieces required for each lay is known as a 'model'. Lay planning and marker making by computer are increasing rapidly as the cost of systems is reducing. This method increases efficiency, that is the percentage area of fabric used by the pattern. Most manufacturers aim for 80% utilisation of the fabric.

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2 Standard buttoned front 40
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7 Bust dart in vertical seams 42
8 Bust dart in curved vertical seams 42
9 Bust dart in horizontal seams 42
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12 Bust dart in gathers 44
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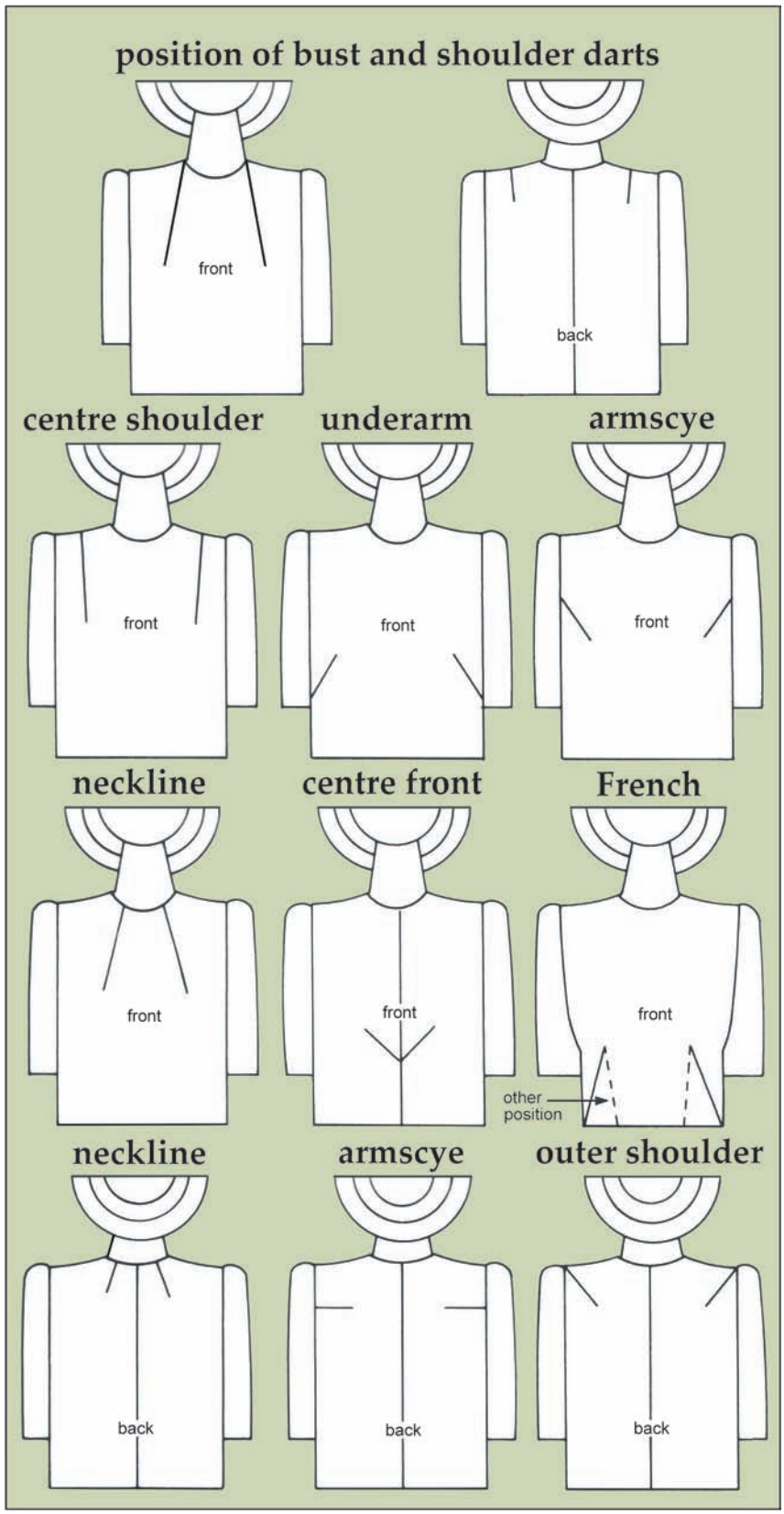


Darting the bodice to give shape for the bust and shoulder blades

It is necessary to consider the shape of the body when designing a bodice. At this stage do not be concerned with waist darts, they are used to shape the waist only.

Experiment with the bust and shoulder darts which provide the shaping for bust and shoulder blades.

Their positions on the bodice block are shown on the drawings.

These positions can be moved around the body as long as the point of the dart remains at the point of the bust or shoulder blades. See diagram opposite. Try swinging the darts to new positions.

Bust dart

Centre shoulder trace round front bodice block. Draw a line from centre shoulder to the point of the bust. Cut up the line. Close original dart and secure with tape.
The bust dart is now in centre shoulder position. By the same method transfer bust dart to: *underarm*; *armscye*; *neckline* and *centre front*.

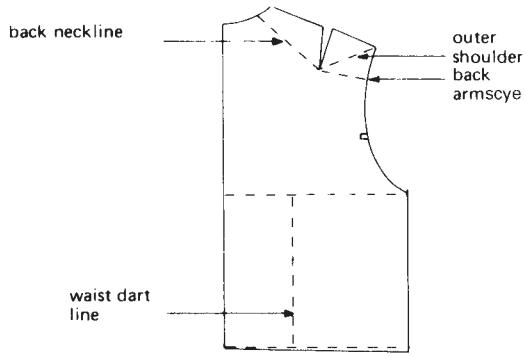
French dart this dart combines bust dart and front waist dart. Trace round front bodice block, draw in the waist shaping. Draw a line from a point at waist side seam to bust point. Cut up the line. Close bust dart and front waist dart to make a very large dart at base of side seam. This large dart can be placed at the waist position.

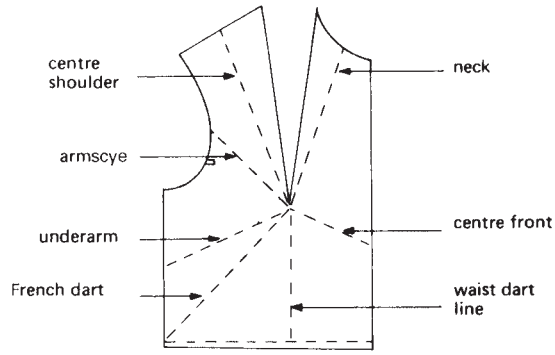
Note When the bust dart is in the final position for the design, shorten it by 2 cm.

Back shoulder dart

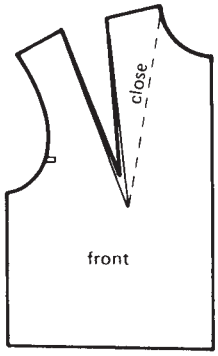
Neck trace round back bodice block. Draw a line from neck to base of shoulder dart. Cut up the line. Close shoulder dart. By the same method transfer shoulder dart to:
armscye; *outer shoulder point*.

Other positions of bust and shoulder darts

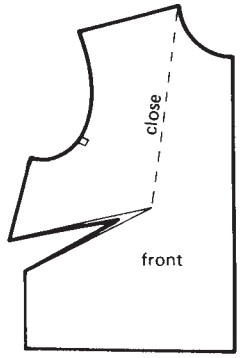




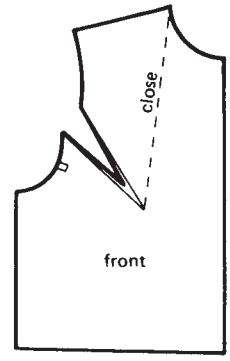
Centre shoulder



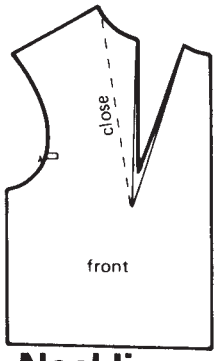
Underarm



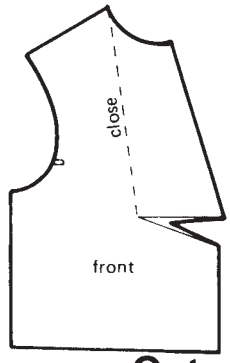
Armscye



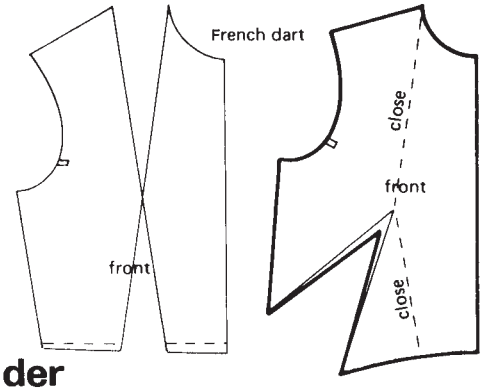
Neckline



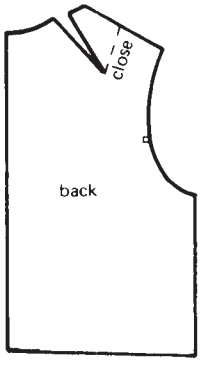
Centre front



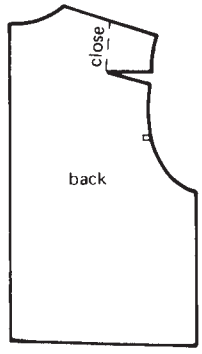
Combined bust and waist darts



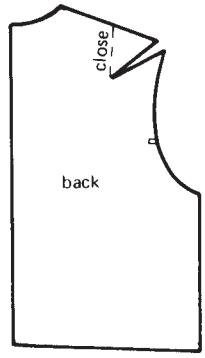
Neckline

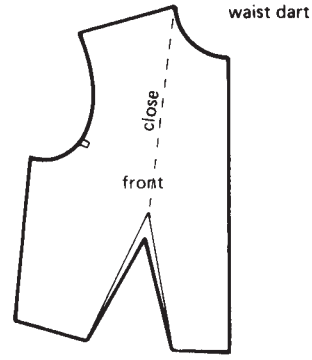


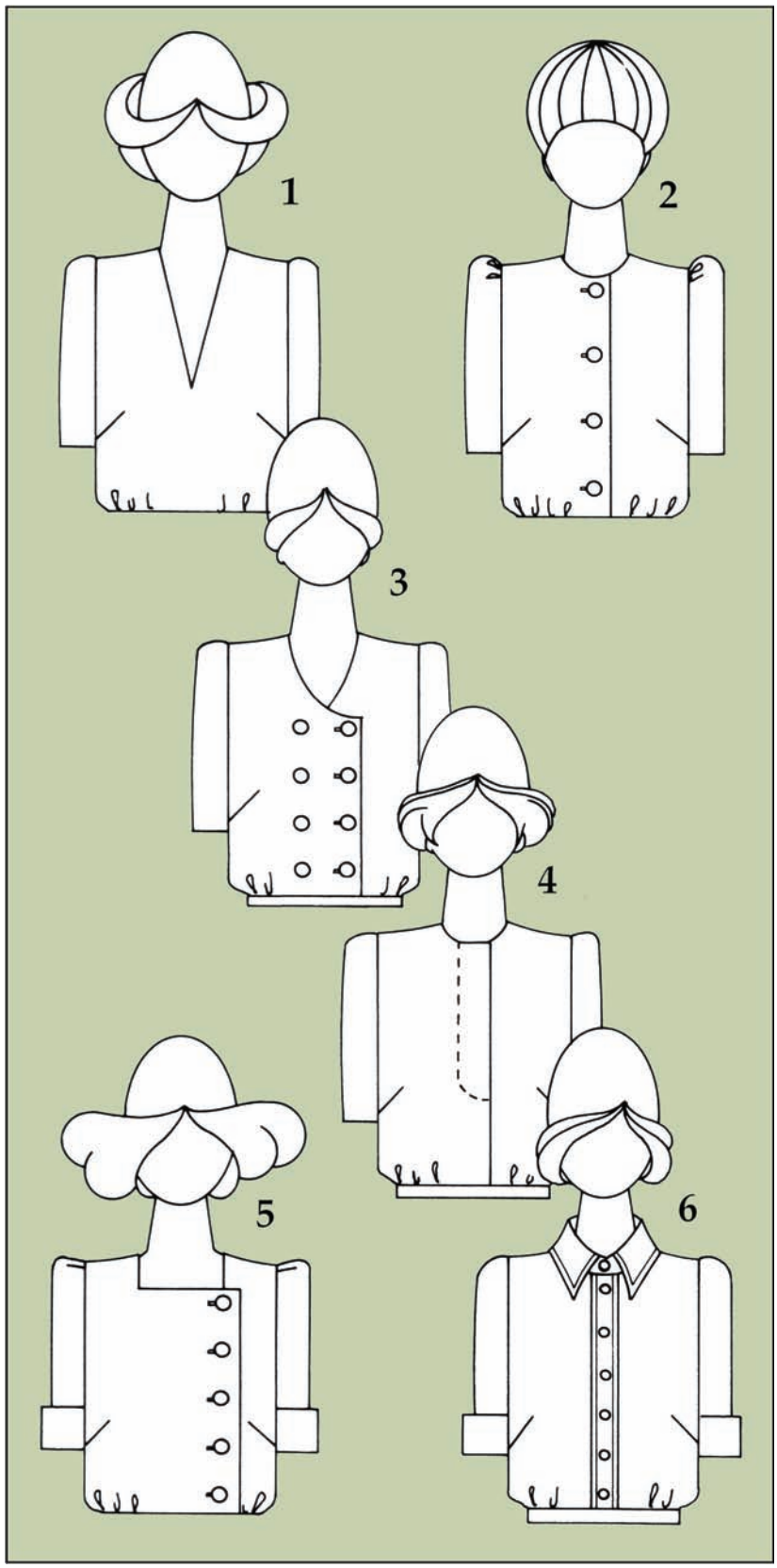
Armscye



Outer shoulder







Openings

1 *Low cut fronts*

Low cut necks can gape at front. To correct, move bust dart to underarm position. Draw neckline. Make small dart approx. 0.6 cm wide from neckline to bust point. Close dart. Correct slightly distorted neckline.

2 *Standard buttoned front*

Mark buttonholes on centre front line (buttonholes overlap this line by 0.2 cm); add buttonstand approx. 2.5 cm; this varies with size of button.
Fold outer line, wheel through the outline and facing line to make extended facing.

3 *Double breasted front*

Alter neckline to shape required. Draw in two button lines, equal distance each side of centre front. Mark buttonholes (as standard front). Add buttonstand.
Wheel through separate facing.

4 *Fly front*

Right front Add buttonstand to centre front. Draw in finished stitch line. Add an extension to front edge 5 cm below stitch line and 2.5 cm wider than width of stitching. Wheel through a facing with the same extension.
Mark vertical buttonholes on centre front line of facing.
Left front Construct left front as a standard buttoned front.

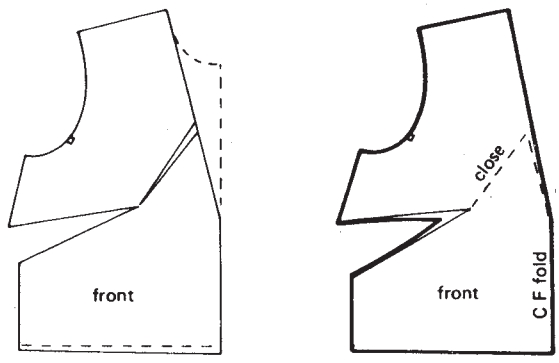
5 *Asymmetrical front*

Trace complete front of bodice, mark button line, mark buttonholes, add buttonstand. Draw in neckline.
Make a separate facing.
Trace left front to button line, add buttonstand and extend facing.

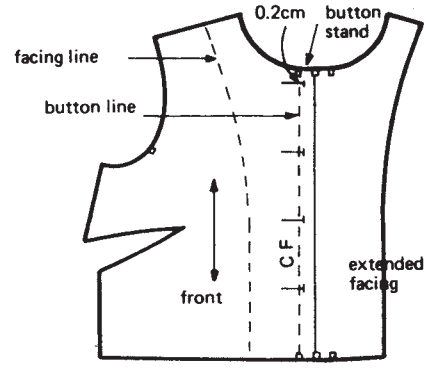
6 *Shirt front*

Right front Add buttonstand 1.5 cm wide. Draw a line 1.5 cm in from centre front. Wheel through front strap. Mark in vertical button holes on centre front line.
Left front Add buttonstand and an extended facing 3 cm wide.

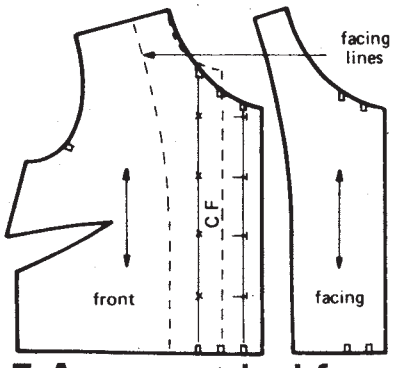
1 Low cut front



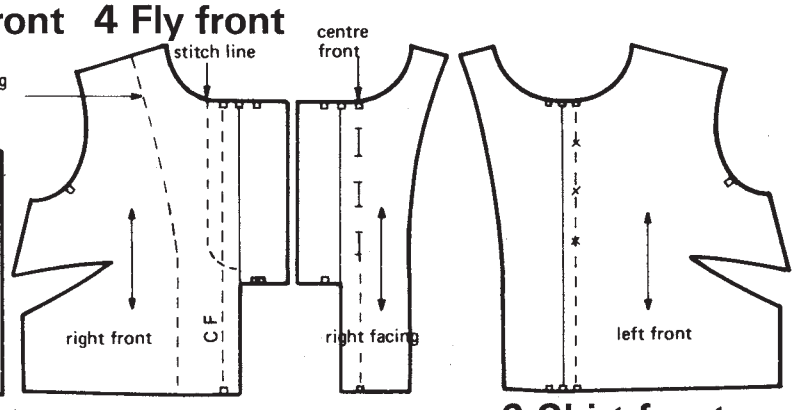
2 Standard buttoned front



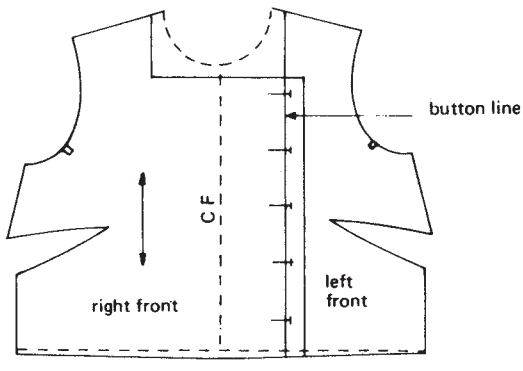
3 Double breasted front



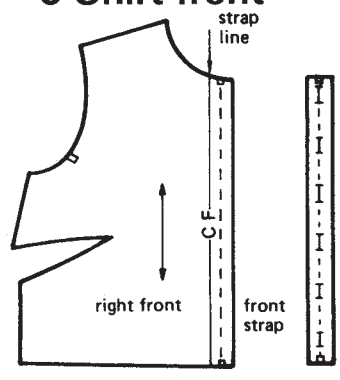
4 Fly front

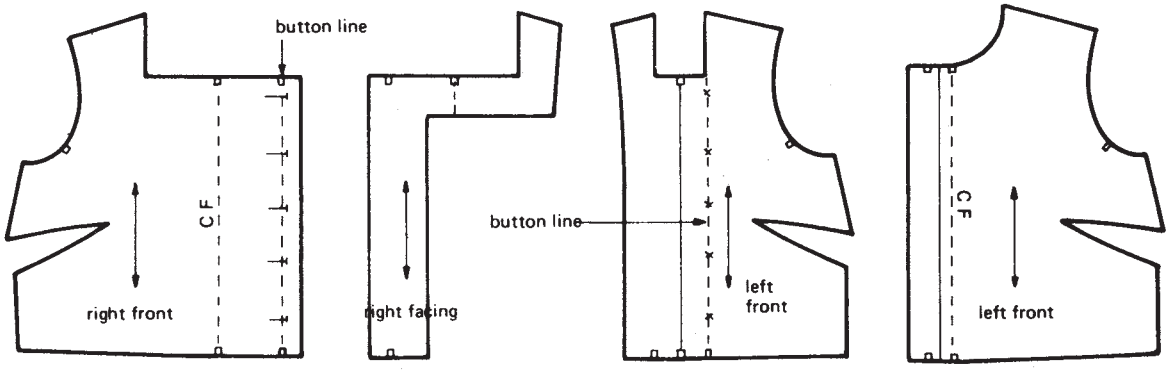


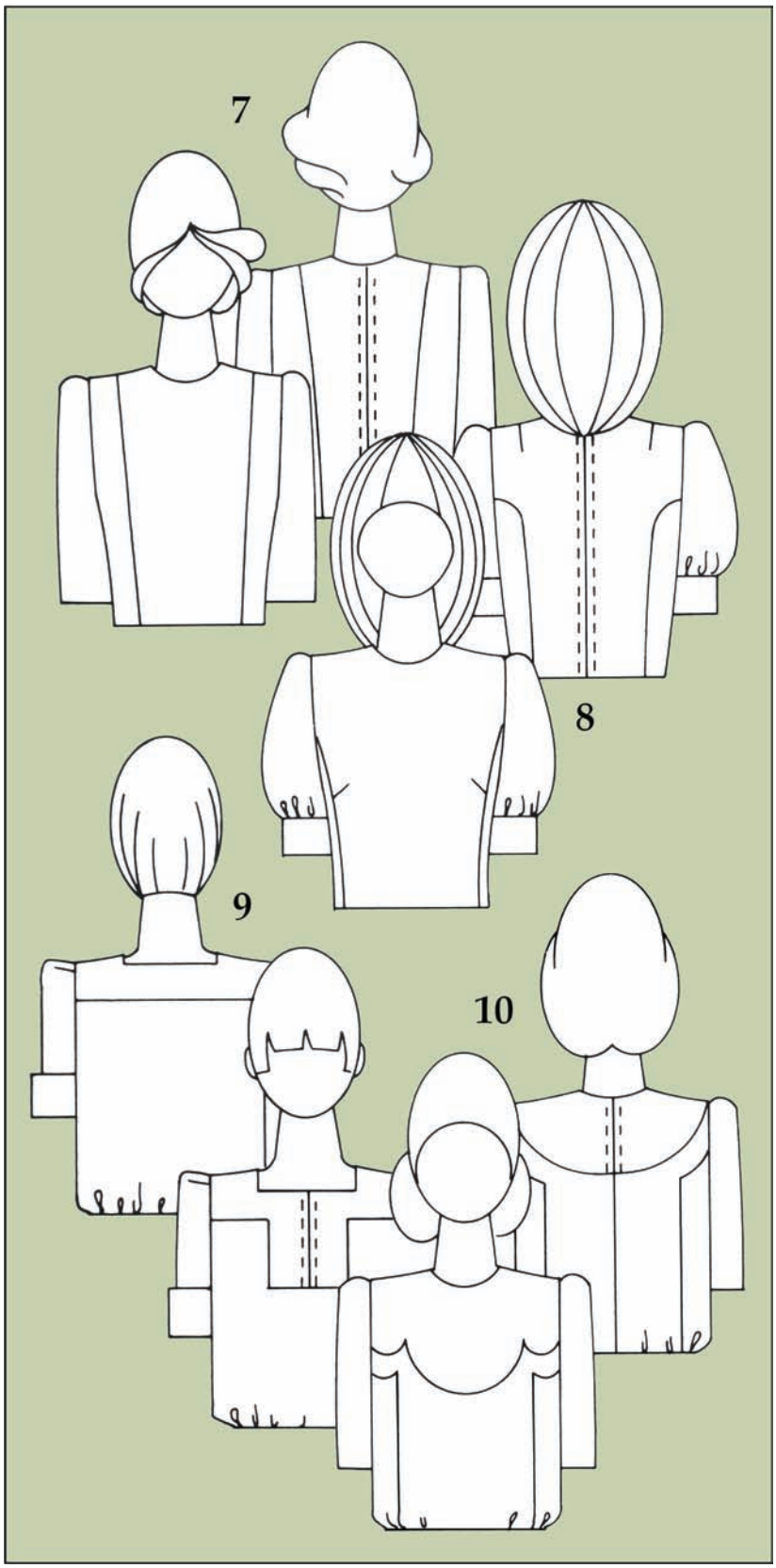
5 Asymmetrical front



6 Shirt front







Darts in seams

Darts can be placed in seams if the seam goes through the bust point. If seam is away from the bust point a small dart or ease will still be required to give shape to the bust, e.g. 8.

7 Bust dart in vertical seams

Trace round bodice block required.
Draw a line from back shoulder dart to top of waist dart. Transfer bust dart to centre shoulder. Cut out panel sections and trace round.
Curve panel and side seams as shown.
Shape waistline at base of panels.

8 Bust dart in curved vertical seams

Trace round bodice block required.
Draw in fitted side seam and curved panel lines; draw in required amount of waist shaping on these lines.
Draw a line from front panel to the base of bust dart.
Cut out panel sections, trace round.
Close bust dart to transfer it to panel line. Shape seams, shape waistline at base of panels.

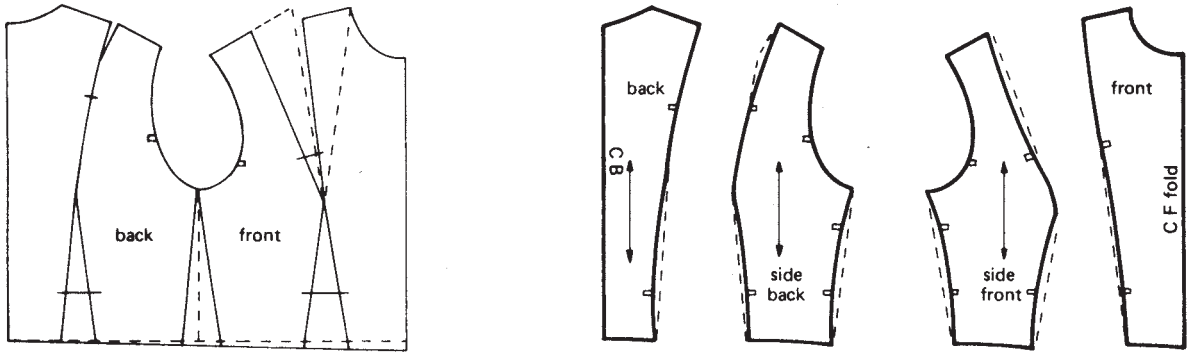
9 Bust dart in horizontal seams

Trace round bodice block required.
Back yoke Draw in back yoke line, slope it down 1 cm to armscye edge from base of shoulder dart.
Cut away yoke; close shoulder dart.
Draw in square neckline.
Back Draw panel line, points 1–2. Draw slight waist shaping. Cut up panel.
Trace round back pattern.
Front Transfer bust dart to side panel line. Draw in square neckline and front yoke line. Cut away yoke and trace round. Close bust dart.

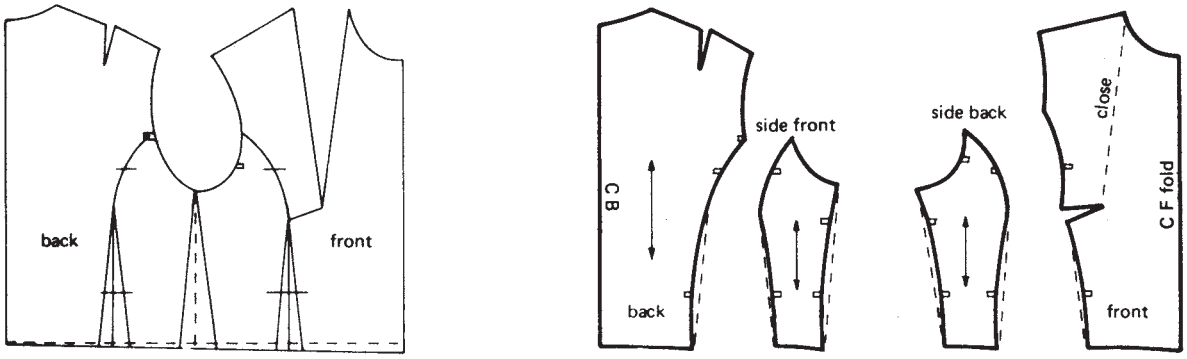
10 Bust dart in curved seams

Trace round bodice block required.
Draw in panel lines on block. Cut into sections.
Trace round lower sections.
Back yoke Extend back dart to edge of yoke. Close dart.
Front yoke Close bust dart.

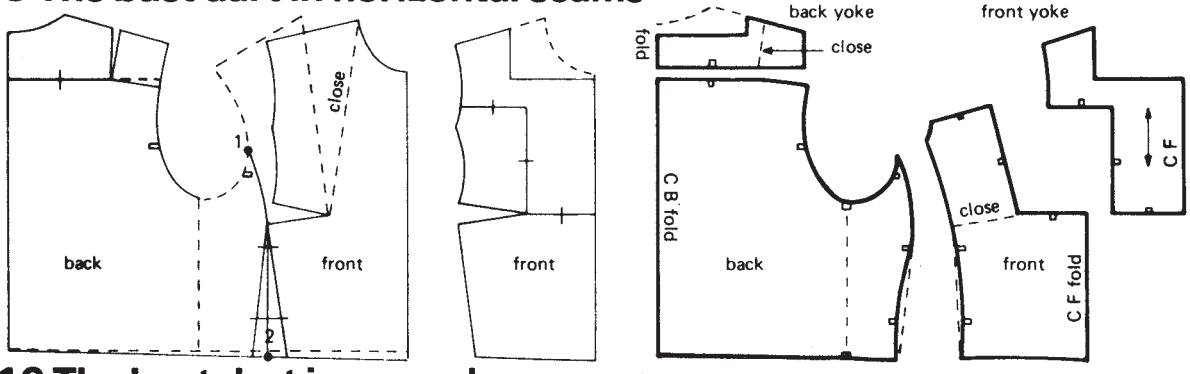
7 The bust dart in vertical seams



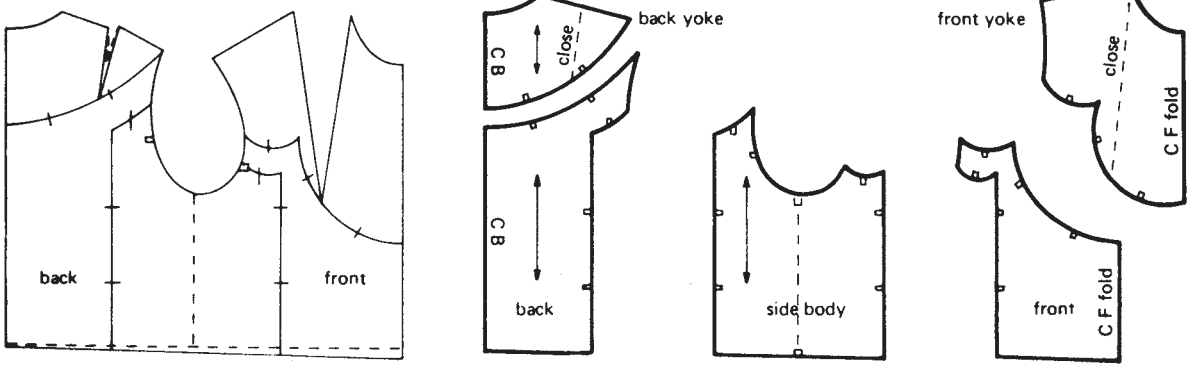
8 The bust dart in curved vertical seams

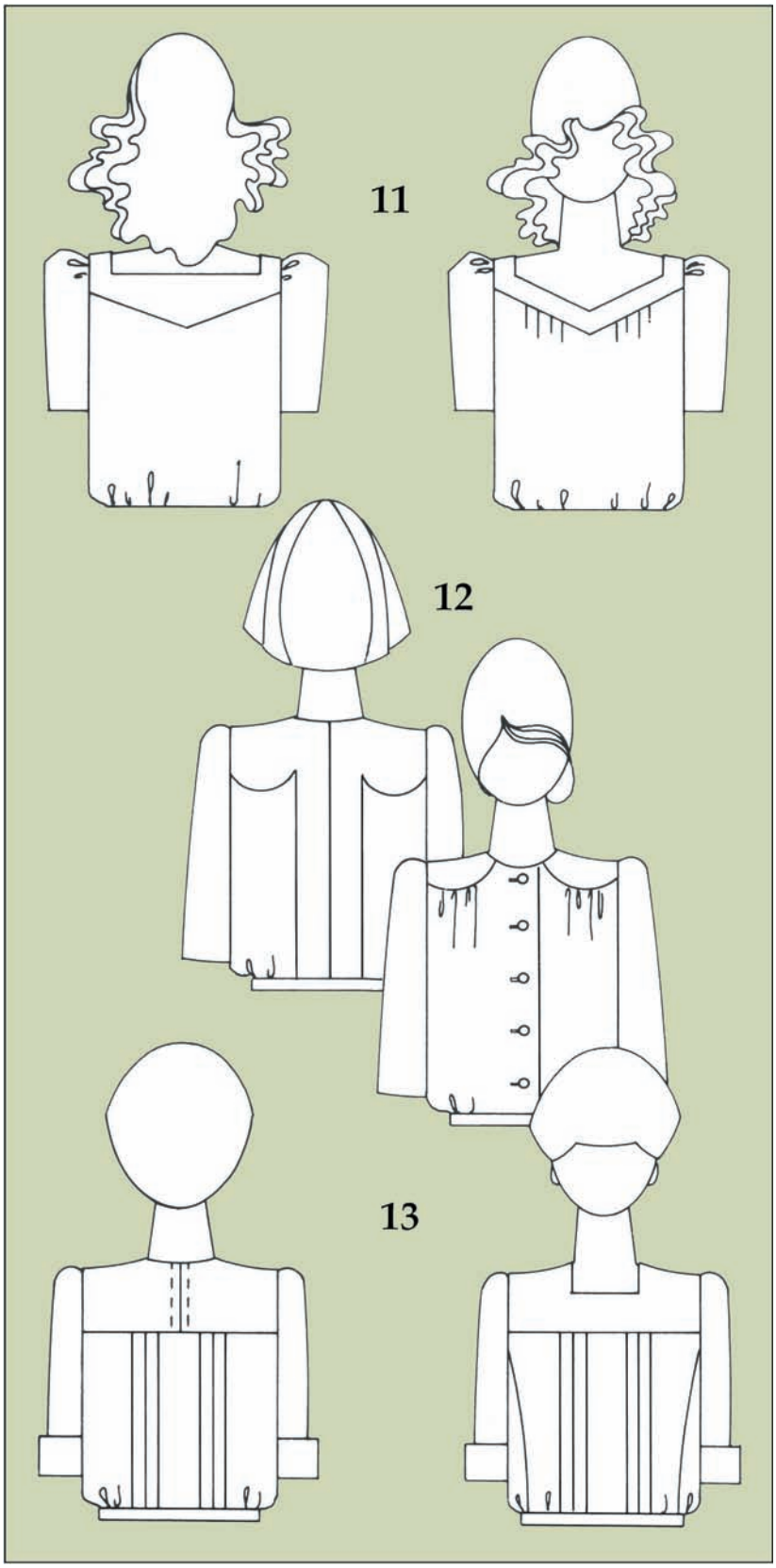


9 The bust dart in horizontal seams



10 The bust dart in curved seams





Darts in fullness

Darts can be placed in fullness, e.g. tucks, gathers and pleats.

11 Bust dart in tucks

Trace round bodice block required. Transfer bust dart to underarm (cut down side seam to top of dart).
Yokes Draw in yoke lines, cut away, close back dart. Draw in neckline. For wide necklines narrow shoulder at armscye of back and front yokes.
Back Trace round back section.
Front Draw vertical line through bust point; cut up this line. Close underarm dart. Trace round front sections allowing 2 cm gap between vertical lines.
Mark four tucks on the top line of front. Size of tuck is the distance 1–2 divided by 4.

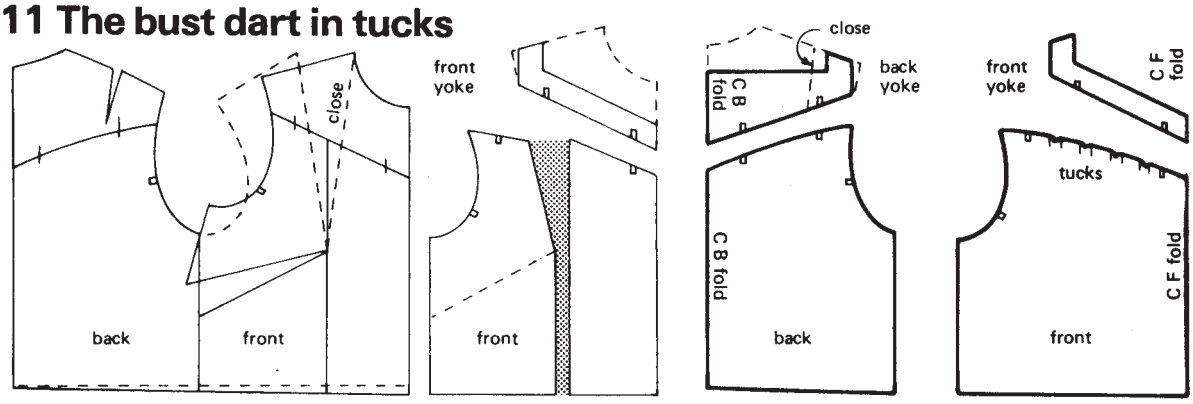
12 Bust dart in gathers

Draw round bodice block required. Cut up side seam.
Back Draw in back panel. Cut up lines.
Trace round panels. Close dart.
Front Transfer bust dart to underarm. Draw in yoke line; mark balance points. Drop a vertical line from yoke through bust point. Cut away yoke. Cut up vertical line, open 3 cm. Close underarm dart. Trace round pattern.
Mark buttonholes. Add buttonstand and facing to centre front.

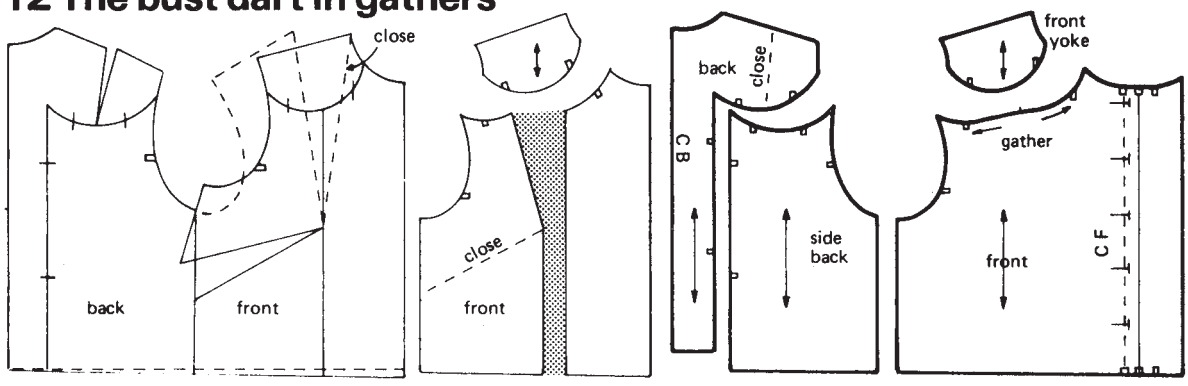
13 Bust dart in pleats

Trace round bodice block required. Draw in front panel line. Cut up panel line. Transfer bust dart to panel seam. Draw in back yoke line, slope down 1 cm at armscye from base of shoulder dart. Draw in front yoke line. Cut away yokes and trace round. Close back dart. Draw in front neckline.
Bodice sections Draw in pleat lines (2 cm wide) on both bodices cut up pleat lines. Insert 4 cm between the pleat lines.
Trace round new patterns, close underarm dart.
Fold pleats, cut out patterns.
Note Pleats on front bodice can be stitched down to bust line.

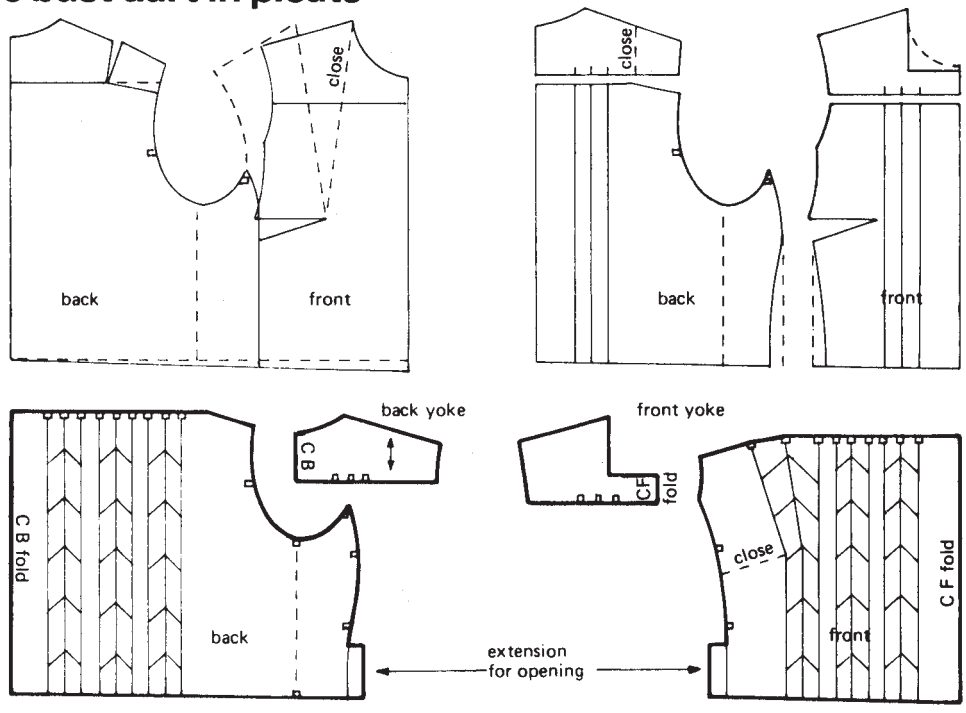
11 The bust dart in tucks

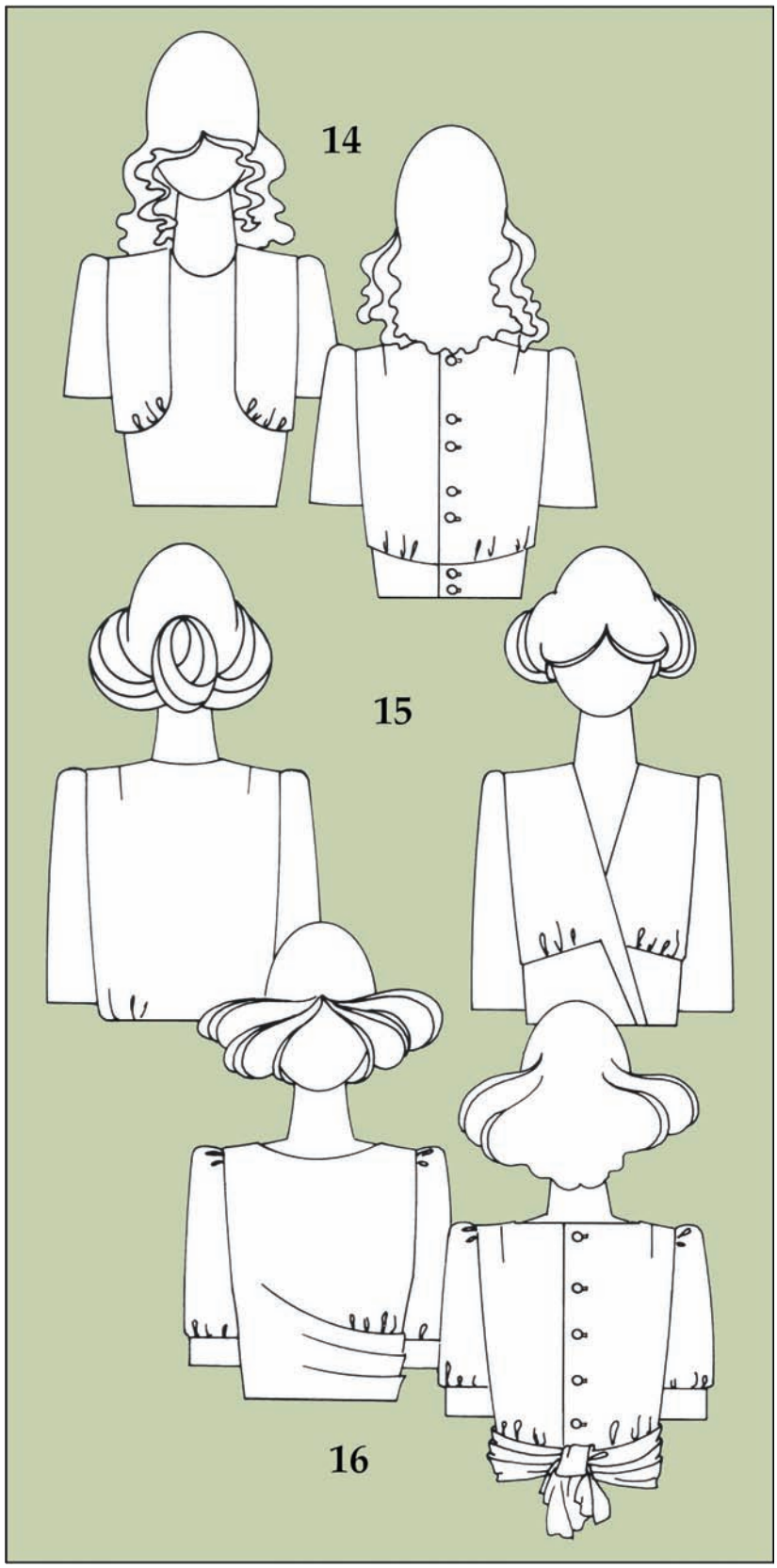


12 The bust dart in gathers



13 The bust dart in pleats





14 Gathered bust seam

Trace round fitted bodice block.
Transfer bust dart to armscye, draw in shaped bust seam and extend across back. Mark balance points for position of gathers.
Draw a line from front armscye to shaped bust seam as shown.
Shaped front panel Cut away lower sections and place together as shown, overlap 2.5cm at top of side seam. Trace round making a smooth line along top edge.
Mark buttonholes and add buttonstand, at centre back.
Side front Close bust dart. Cut up drawn line, open 2cm at bottom for extra fullness.
Trace round pattern.
Back Straighten side seam. Mark buttonholes, add buttonstand.
Make a combined facing for back and lower panel.

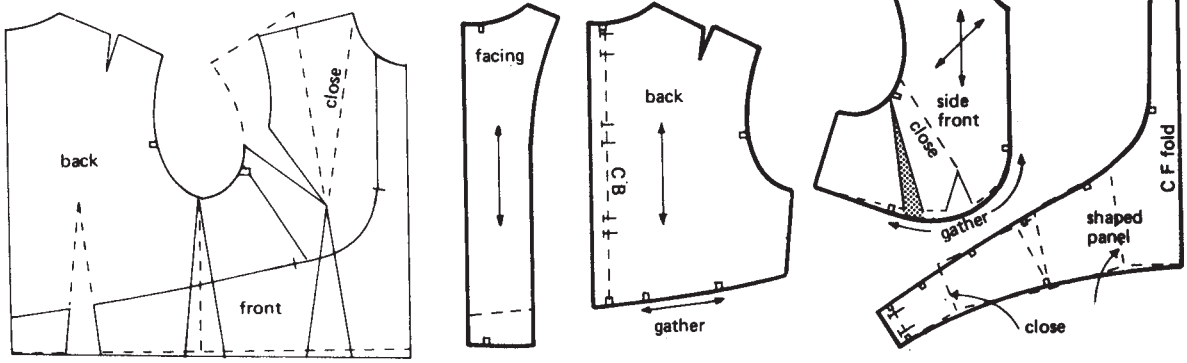
15 Wrap over front

Trace round fitted bodice block (both sides of front). Transfer dart to armscye. Draw in wrap over front and midriff line.
Mark balance points for positions of gathers.
Make a small dart in neckline (ref. Low cut front, page 40).
Front Cut up side seams and cut away lower section. Close armscye and neck darts on upper section, trace round, straighten neckline.
Close dart on lower section, trace round.
Back Trace round back pattern, rub out waist dart.

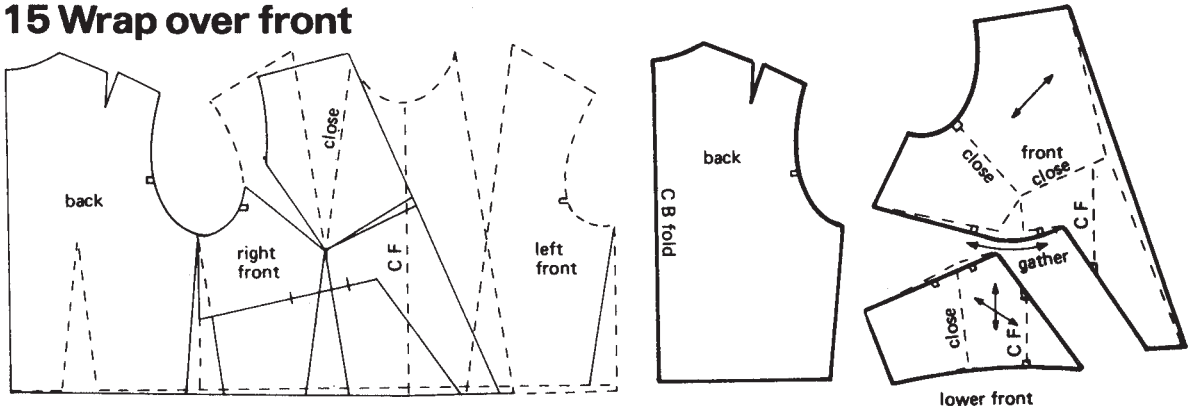
16 Draped front

Trace round bodice block required (both sides of front). Mark drape lines across front bodice.
Cut up side seam.
Back Trace round back pattern, lower neckline, mark buttonholes, add buttonstand and extended facing, rub out dart.
Front Cut along drape lines, close waist darts. Close both bust darts.
Open drape lines approx. 4cm.
Trace round pattern.
Lower neckline.
Extend lower section to length required for tie. Trace tie piece for facing and back tie pattern.

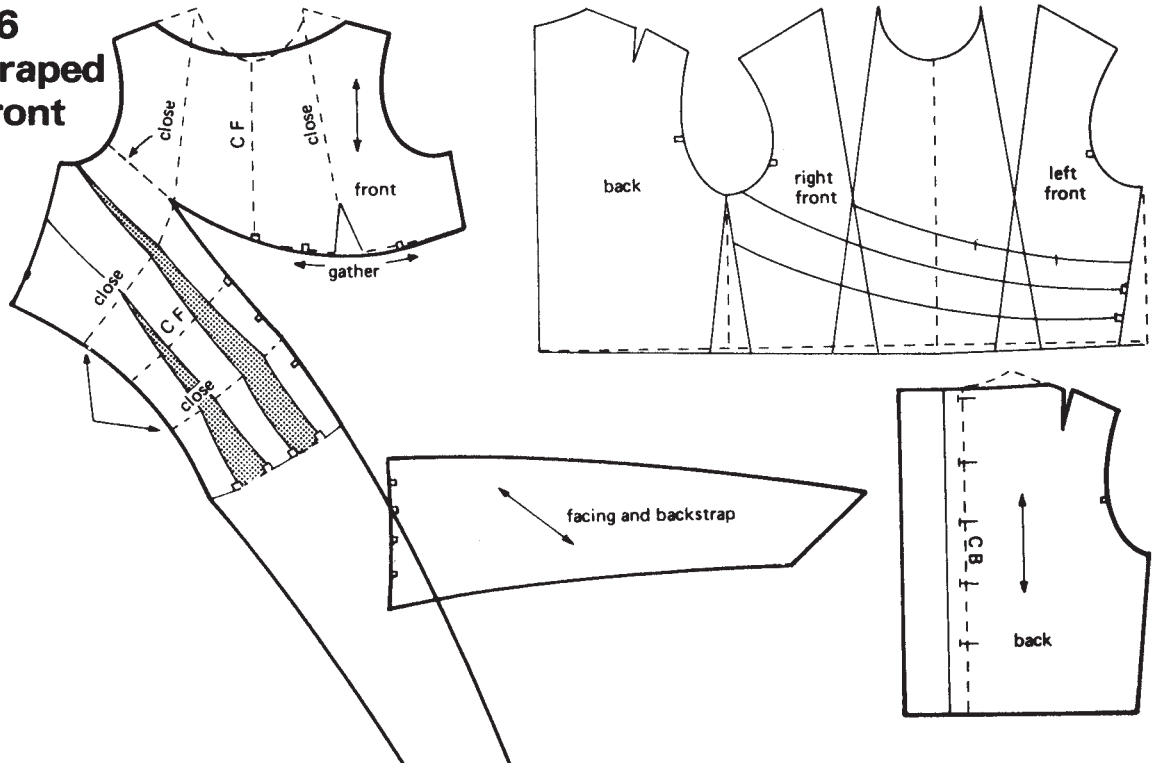
14 Gathered bust seam

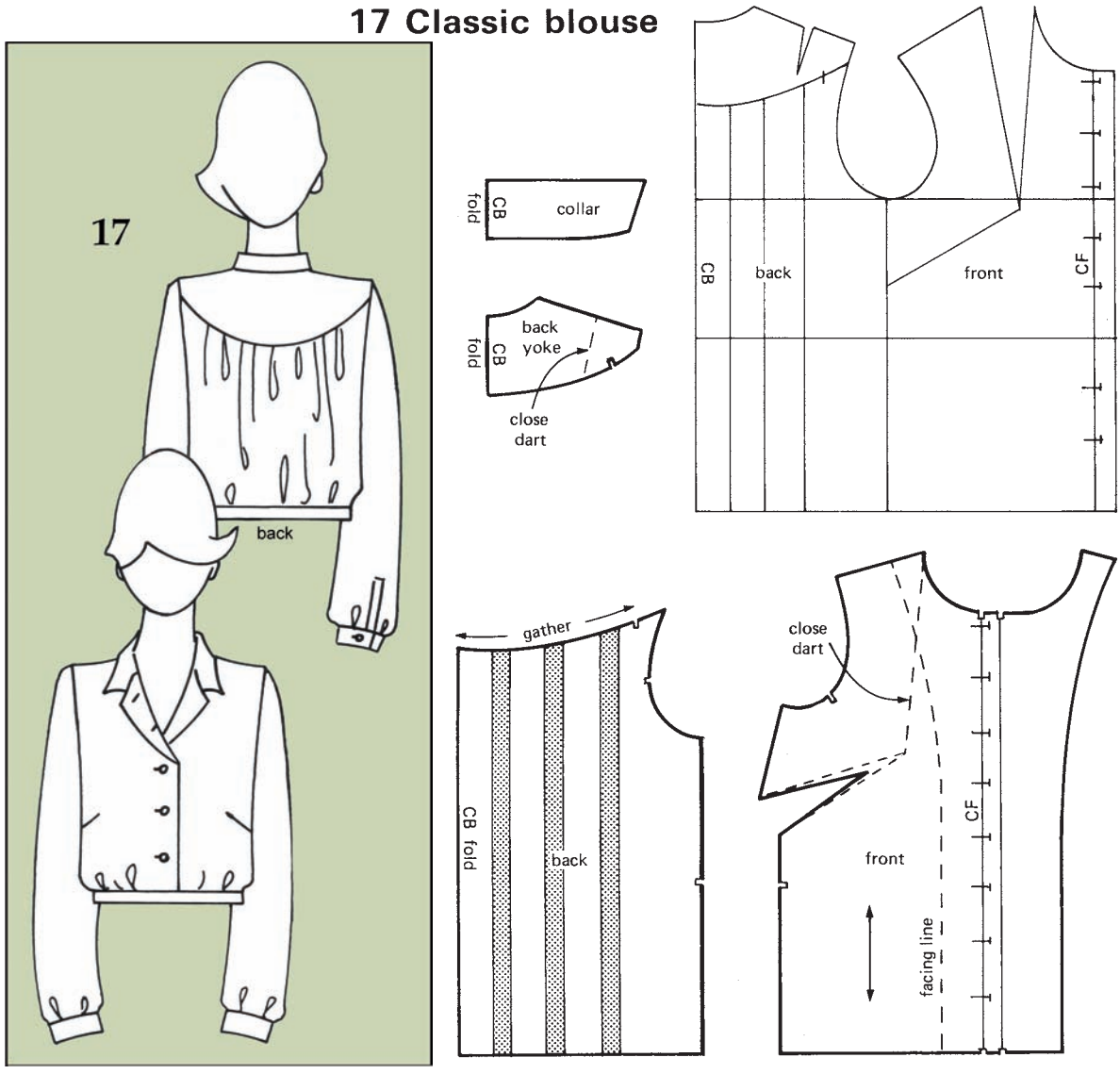


15 Wrap over front



16 Draped front





Classic blouse shapes

The design illustrates the procedure and order for the simple adaptation of a blouse shape with a set in sleeve.

The basic shape is suitable for styles that require the retention of bust shaping and therefore require a block with a bust dart. Select the close fitting block for full bust shaping, the easy fitting for an easier fit.
Note If a classic shirt style without bust darting is required select the basic shirt block on page 140.

17 Classic blouse

Trace round bodice block required to hipline. Draw in buttonholes; add buttonstand. Place any shoulder ease into 0.5 cm dart. Draw back yoke line; divide the line into four sections; square down.
Cut up side seam.
Back Cut away yoke, extend dart to yoke line; close dart.
Cut up lines on back section, open approx. 2 cm.
Redraw yoke line curve.
Front Transfer dart to underarm; shorten dart.
Draw in facing line; construct an extended facing (ref. 2 page 40).
Sleeve Shirt sleeve (ref. 2 page 50 or ref. 24 page 56).
Collar Convertible collar (ref. 8 page 72).

PART ONE: CLASSIC FORM CUTTING

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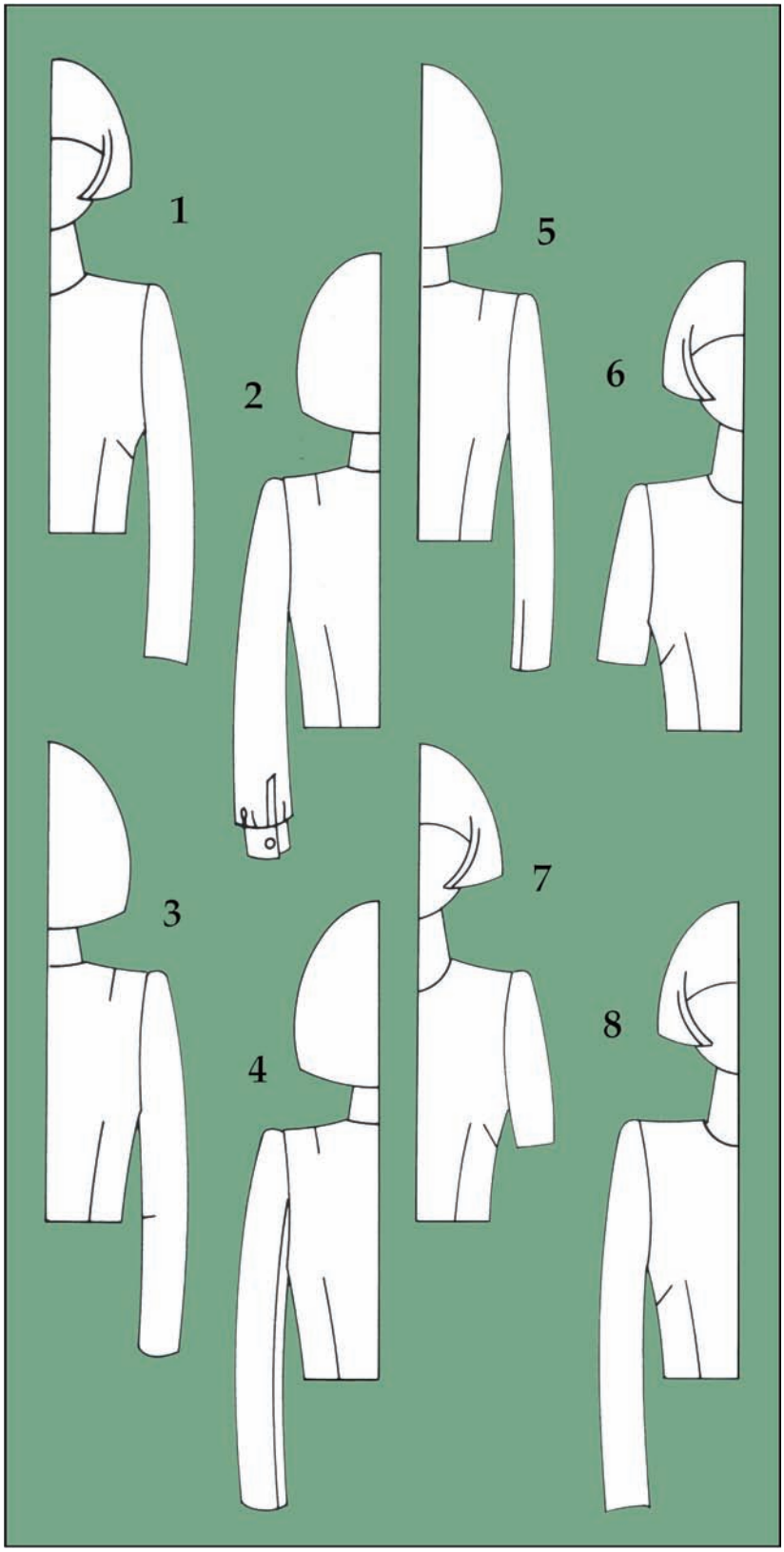
47 Fitted Cape 66

Cuffs *68*



1 Straight sleeve

Trace basic sleeve block, hollow side seams 0.5 cm. Short sleeve line is midway between armscye and elbow. Three quarter line is midway between elbow and wrist.

2 Shirt sleeve

Shorten straight sleeve by depth of cuff. Mark back opening midway between centre line and side seam. Narrow at wrist 2.5 cm.

3 Semi-fitted sleeve

Trace straight sleeve. Narrow sleeve at wrist by 3 cm. Shape seam. Cut from back elbow line to point 1 and from point 1 to wrist line. Pivot this section forward 4 cm, to make a dart at elbow line. Halve the length of dart less 1 cm. Mark in new centre line from point 1 to centre of wrist.

4 Sleeve with back seam

Trace semi-fitted sleeve. Draw line From back balance point through dart point to wrist ($^1/_4$ wrist measurement).
Place side seams together at underarm and wrist. Close dart.

5 Close fitting sleeve

Trace semi-fitted sleeve. Take 1.25 cm off each side seam. Cut up centre seam, overlap 1 cm. Drop line from point of dart to wrist. Cut line, close elbow dart. Shorten dart. Make wrist opening. Raise armscye 1.5 cm. Cut sleeve on the cross in woven fabrics.

6 Short sleeve

Trace straight sleeve pattern to short sleeve line. Shape in 1.5 cm at the bottom of each side seam.

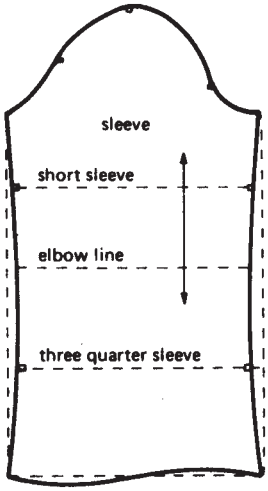
7 Fitted short sleeve

Draw 1 cm dart on centre line.
Close dart. Trace round pattern.

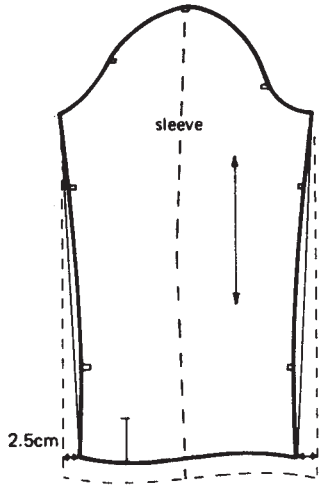
8 Padded shoulders

Trace bodice and sleeve blocks.
Slash from armscye to neck of bodice.
Open depth of pad. Cut across sleeve head and up centre line.
Open out the same amount inserted in armscye.

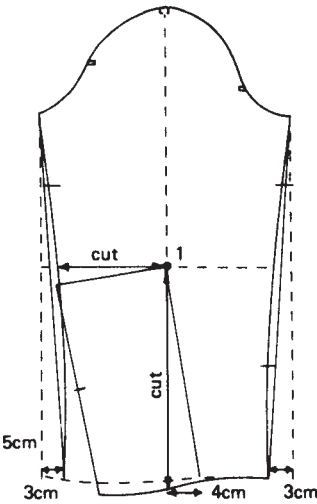
1 Straight sleeve

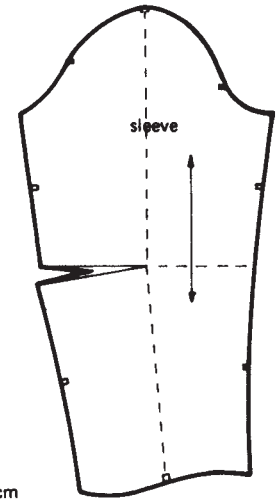


2 Shirt sleeve

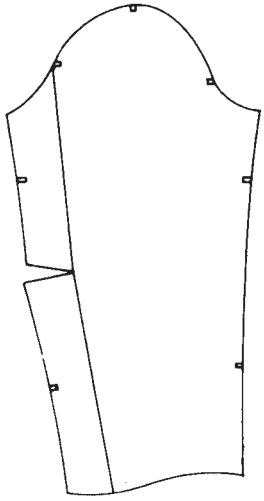


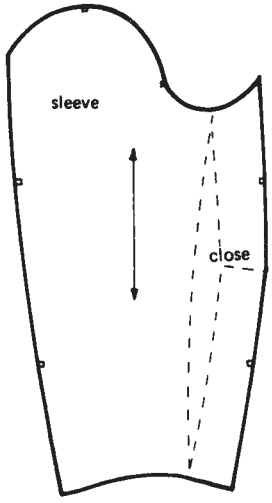
3 Semi-fitted sleeve



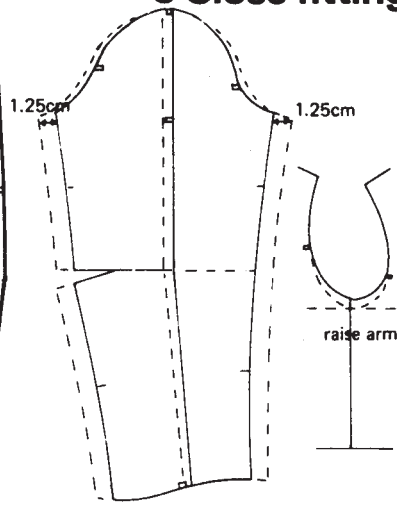


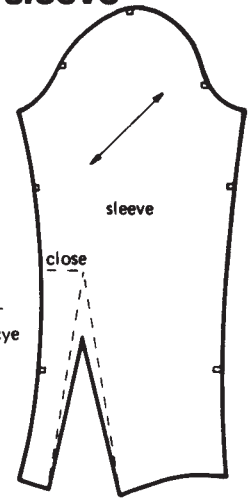
4 Sleeve with a back seam



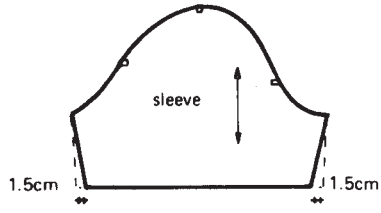


5 Close fitting sleeve

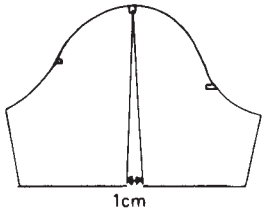


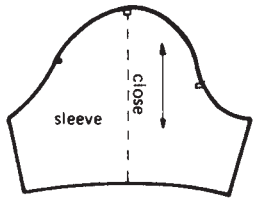


6 Short sleeve

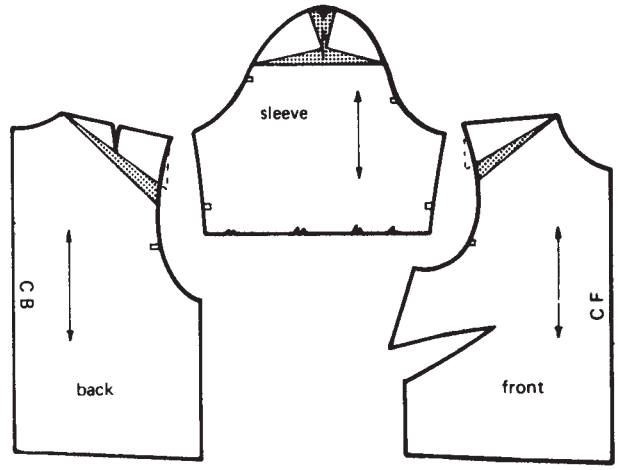


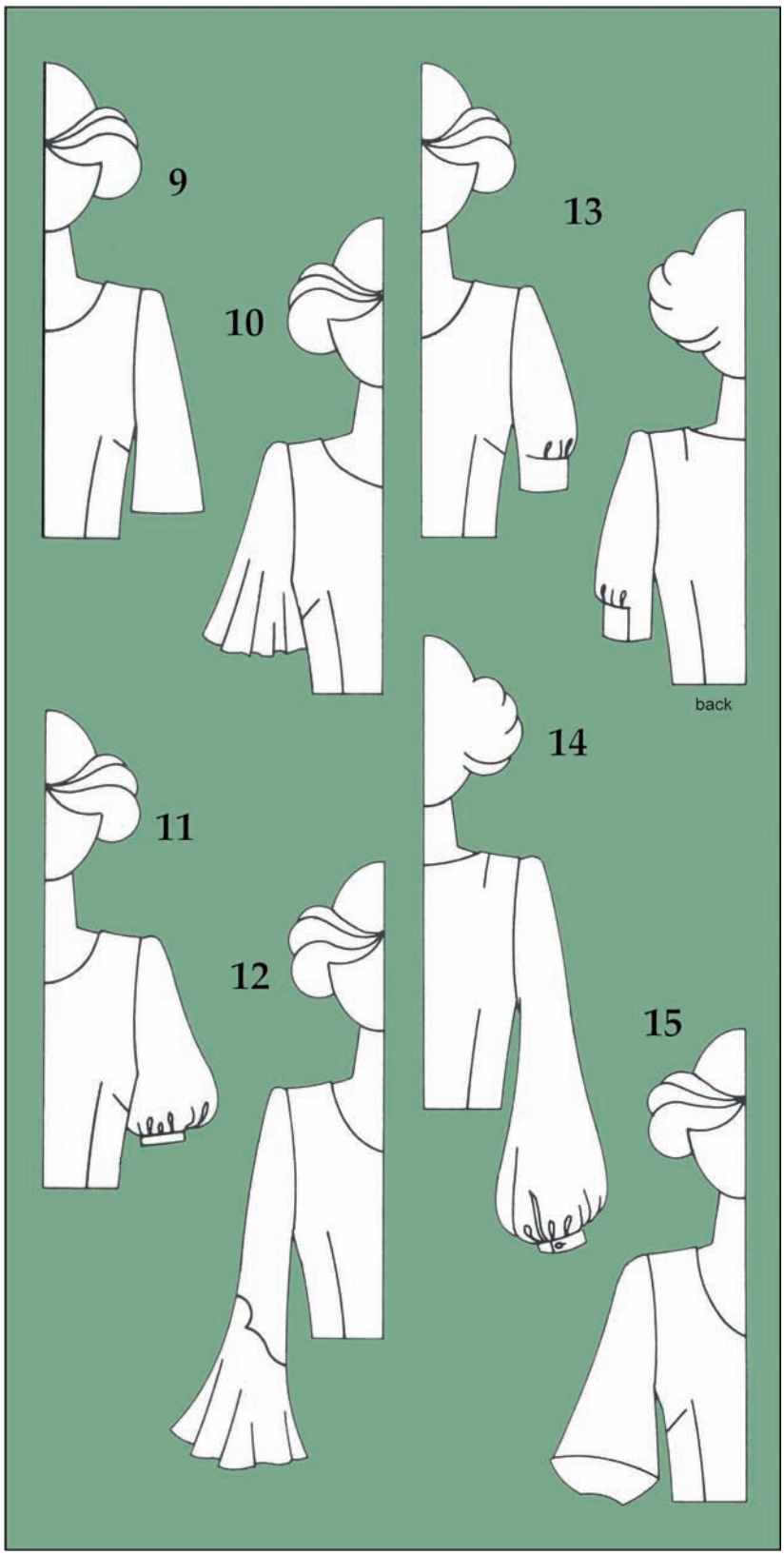
7 Fitted short sleeve





8 Padded shoulders





9 Sleeve with slight flare

Trace straight sleeve to length required. Divide into six sections. Cut up lines, open approx. 1 cm. Grain line is in centre of middle opening.

10 Very flared sleeve

The sleeve is shown with more flare inserted between the sections.

11 Gathered into a cuff

The very flared sleeve can be gathered into a cuff constructed to fit the top arm measurement.

12 Sleeve with flared section

Trace straight sleeve to length required. Shape in 1 cm. Draw in curved shape. Divide lower sleeve into six sections. Cut away lower sleeve. Cut up lines, open for required amount of flare.
Trace round pattern.

13 Sleeve with mock cuff

Trace short sleeve, lengthen 4 cm. Draw in 'cuff' shape. Drop five vertical lines from sleeve head as shown. Cut along 'cuff' line and up lines. Open to give required amount of flare. Trace round pattern.
Fold paper along 'cuff' hemline, wheel through to trace 'cuff' facing. Cut out pattern.

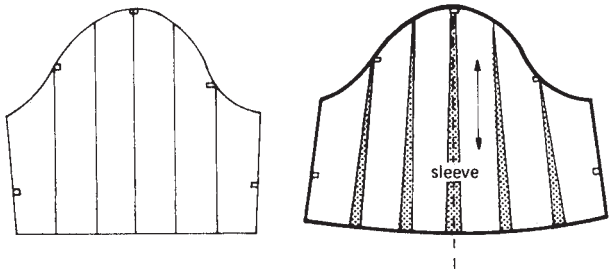
14 Bishop sleeve

Trace straight sleeve. Divide into six sections. Cut out, cut up lines. Draw a vertical grain line on a new piece of paper. Open centre line of sleeve evenly each side of line (e.g. 8 cm). Open the two back lines 8 cm, front lines 4 cm.
After reducing cuff depth measurement, add extra length, twice as much at centre back.

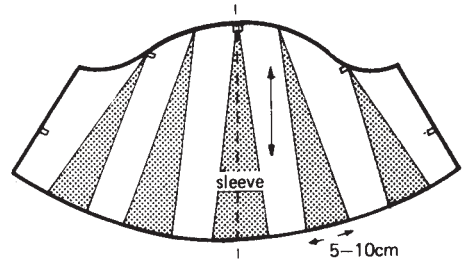
15 Lantern sleeve

Trace straight sleeve to length required, draw in seam.
Divide into six sections.
Cut out top and bottom sleeve. Cut up lines of upper section, open for required amount of flare.
Open sections of lower sleeve at the top the same amount, overlap slightly at lower edge.

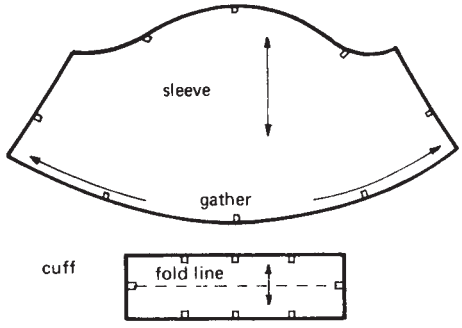
9 Sleeve with slight flare



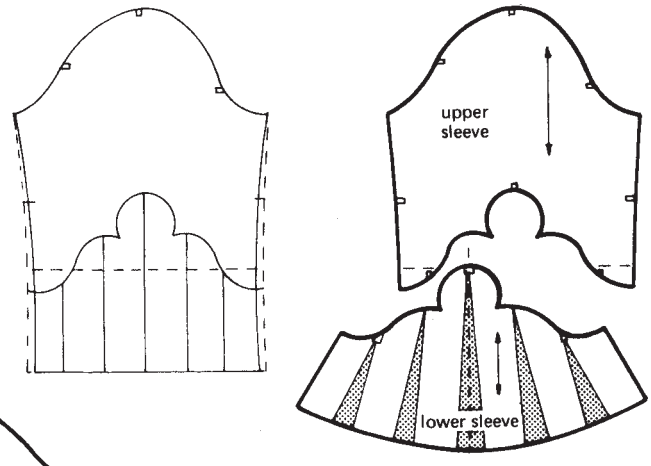
10 Very flared sleeve



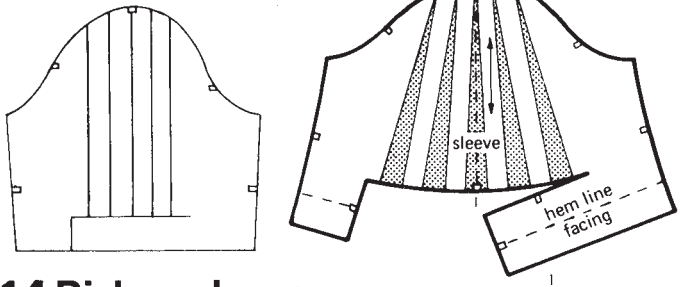
11 Gathered into a cuff



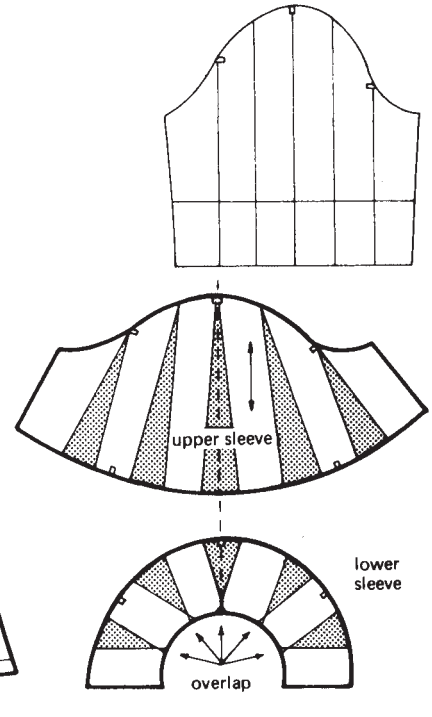
12 Sleeve with flared section



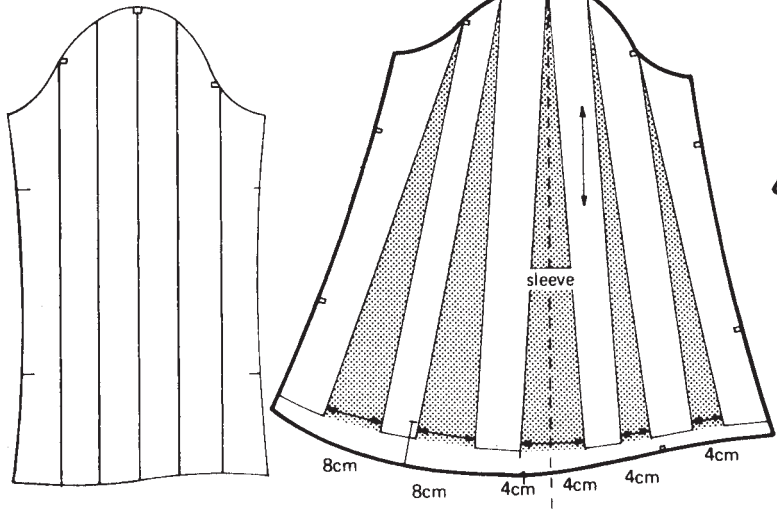
13 Sleeve with mock cuff

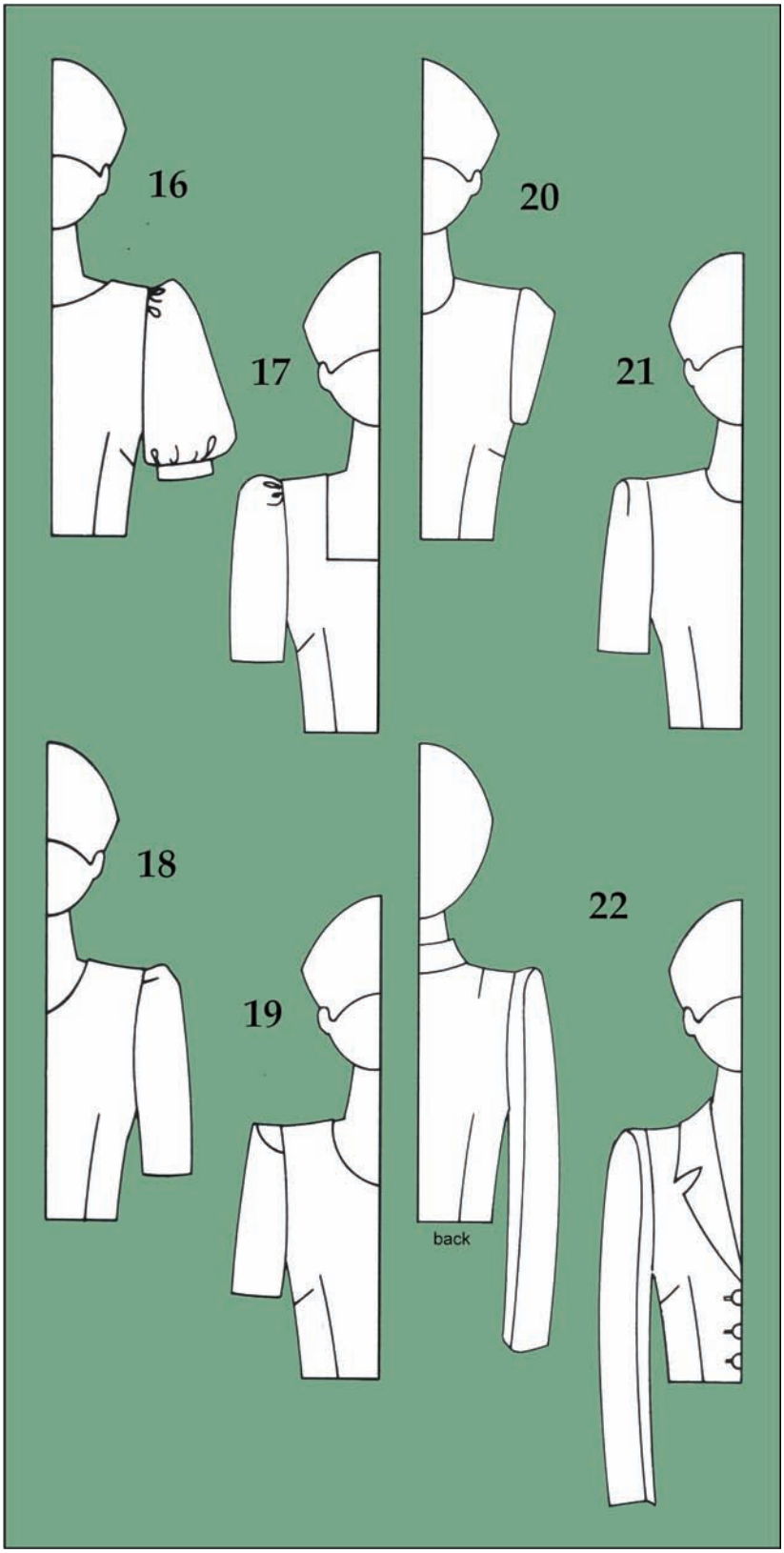


15 Lantern sleeve



14 Bishop sleeve





Adapting the bodice and sleeve

Raised sleeve heads give a wide-shouldered look. If not required take 1 cm off shoulder edges as shown, add 1 cm to sleeve head.

16 Puff sleeve

Trace short sleeve. Divide into six sections. Cut out, open sections amount required. Add extra depth to sleeve head and hem as shown.

17 Gathered head

Trace short sleeve. Divide sleeve head into five sections above back balance point. Mark balance points for gathers at top of sections 1 and 5. Cut up sections, open out.

18 Darted head

Proceed as for gathered head, using four sections. Draw in darts. Trace round pattern shaping dart edges.

19 Seamed head

Trace short sleeve. Drop three vertical lines from sleeve head. Draw in seam line 4 cm down. Wheel through top piece, cut out, open each section 1.5 cm, trace round. Cut out *complete* sleeve, open out 0.75 cm, to fit inset.

20 Inset cap sleeve

Trace short sleeve. Lower sleeve head 2 cm. Draw in depth of cap. Divide into sections, cut out and open till lower line is straight.

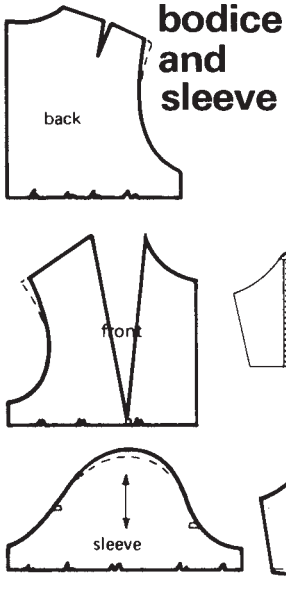
21 Strapped head

Trace short sleeve. Draw strap approx. 3 cm wide, divide into four sections. Take 2 cm ease from sleeve head. Cut up strap lines and centre line, open out as shown. Raise sleeve head 4 cm.

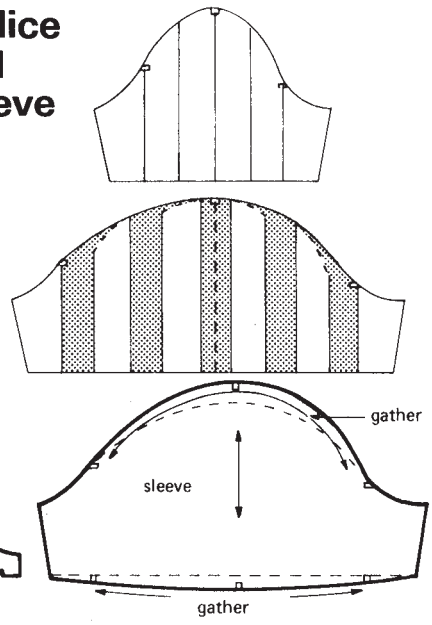
22 Raised seam

Trace semi-fitted sleeve with a strapped head. From strap, drop lines to quarter elbow line, then to quarter wrist line. Cut out, cut up lines. Trace centre section. Close back dart. Join outer sections of sleeve at underarm and wrist. Shape in front seam 1 cm.

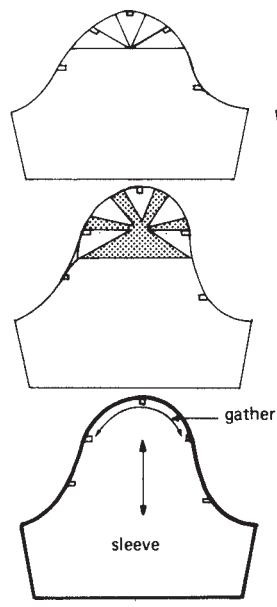
Adapting the bodice and sleeve



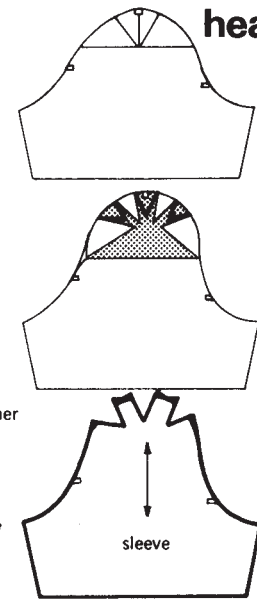
16 Puff sleeve



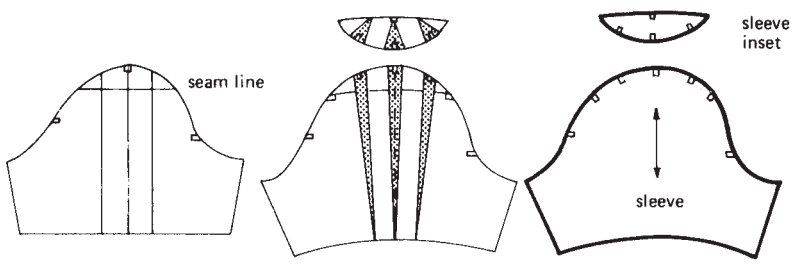
17 Gathered head



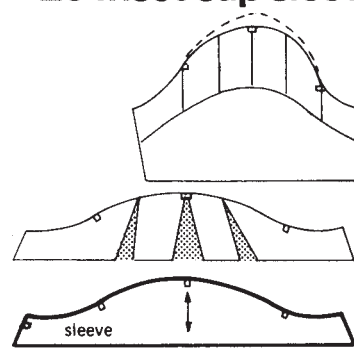
18 Darted head



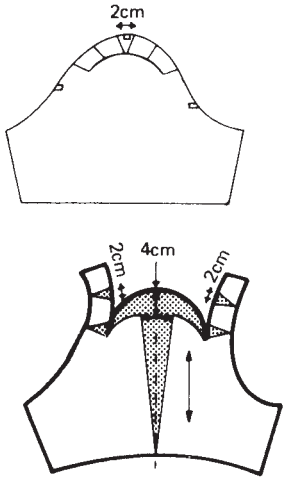
19 Seamed head



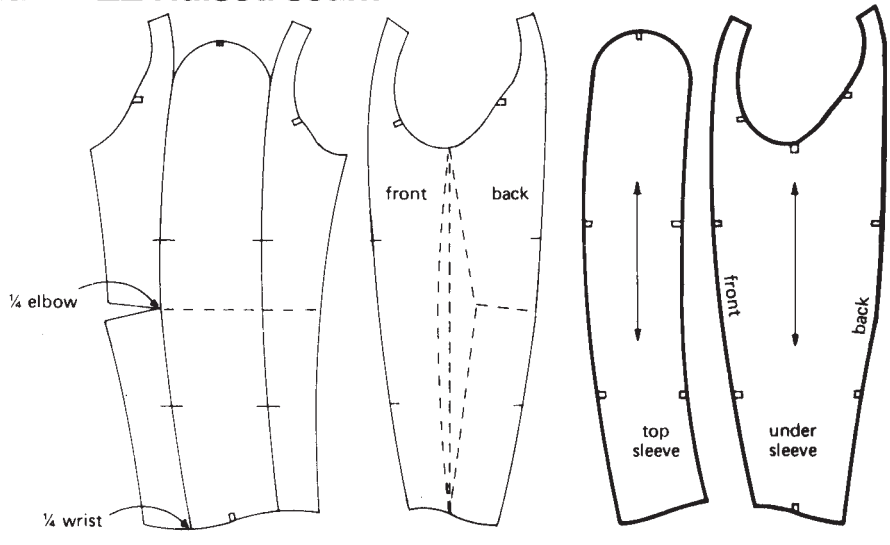
20 Inset cap sleeve

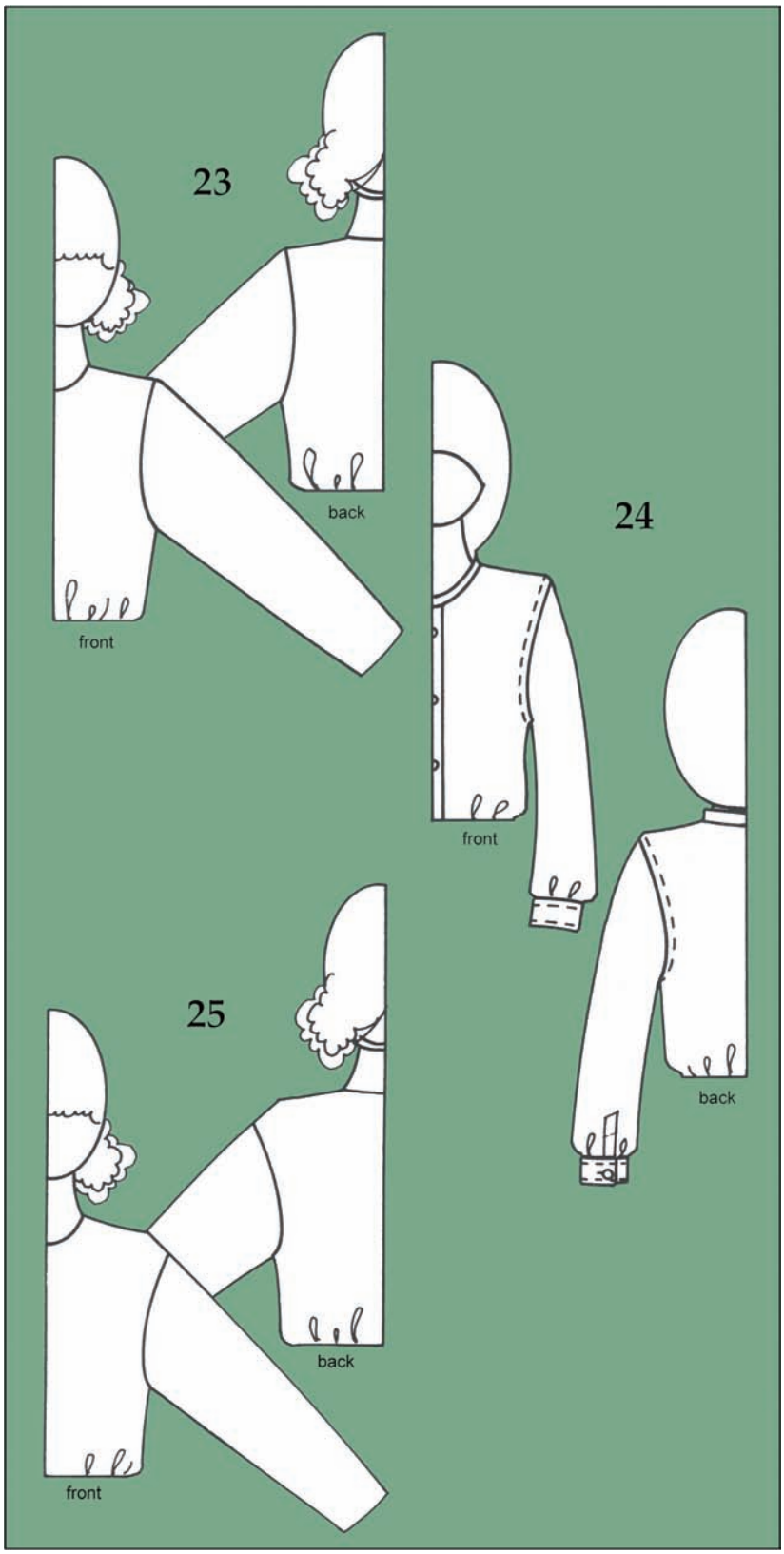


21 Strapped head



22 Raised seam





23 Lowered armscye

For an easy fitting body and armscye shape, complete this adaptation for the lowered armscye before continuing with any further adaptation.
Body section Trace body section of block required; cut up side seam, open 4 cm; draw new side seam down centre. Lower scye depth line 2.5 cm. Mark 1 and 2 on each scye depth line and 3 and 4 at sleeve pitch points. Draw in new armscye shape as shown.
Sleeve Trace one-piece sleeve block. Draw a parallel line below armscye depth, the distance is half the measurement 1–2.
Mark points 5 and 6 at front and back pitch points.
Draw the curve 5–7 to new armscye depth line, the curve should equal the measurement of the curve 3–2.
Draw the curve 6–8 to equal curve 4–2.
Draw underarm seam, narrow at wrist if required.
Note The amount the block is widened and the armscye lowered can be varied, but proportions must remain constant.

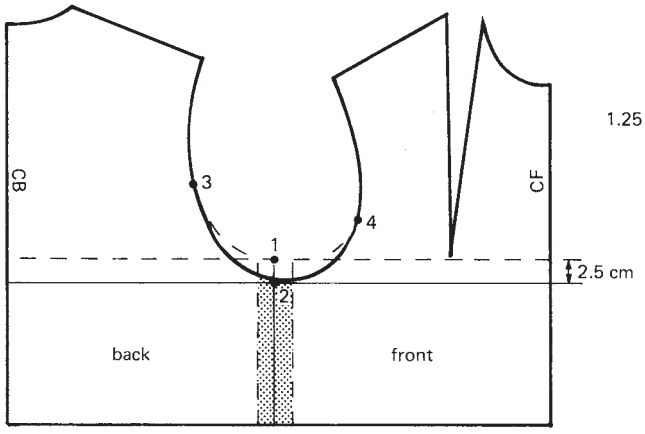
24 Easy fitting 'shirt' armscye

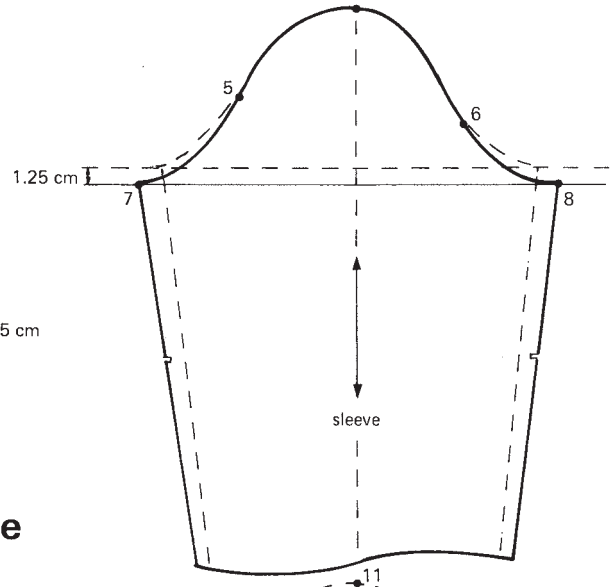
Complete adaptation for lowered armscye. Mark points 2, 3, 4, 5, 6.
Body section Extend the shoulder approx. 2.5 cm, raise shoulder 0.5 cm. 3–9 and 4–10 half the measurement of the shoulder extension.
Draw new shoulder and armscye shape.
Sleeve Mark point 11 at sleeve head.
11–12 amount shoulder is extended.
5–13 half the measurement 3–9.
6–14 half the measurement 4–10.
Draw in new sleeve head from 13–14.

25 Dropped shoulder with lowered armscye

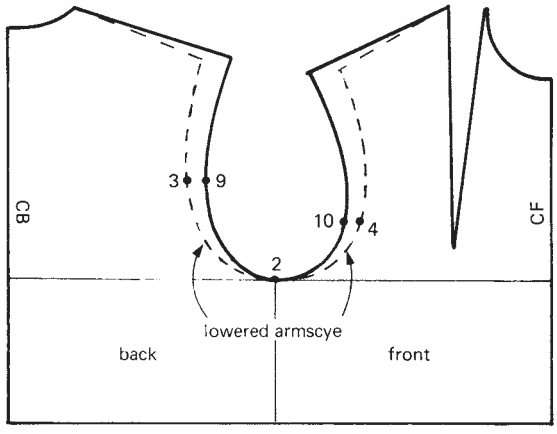
Construct as for shirt armscye. If the shoulder extends more than 2.5 cm it is usually necessary to widen the sleeve.
Mark points 15 and 16 at shoulders.
13–12 should equal 9–15 plus 0.5 cm.
14–12 should equal 10–16 plus 0.5 cm.
If sleeve requires widening, cut up centre line and open required amount. It is possible to open the sleeve at the sleeve head only.

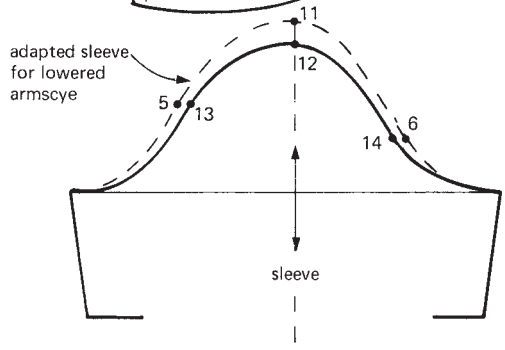
23 Lowered armscye



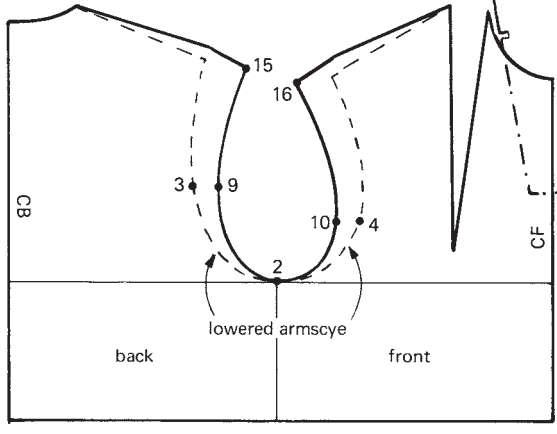


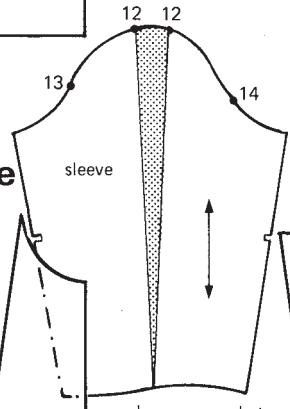
24 Easy fitting 'shirt' armscye

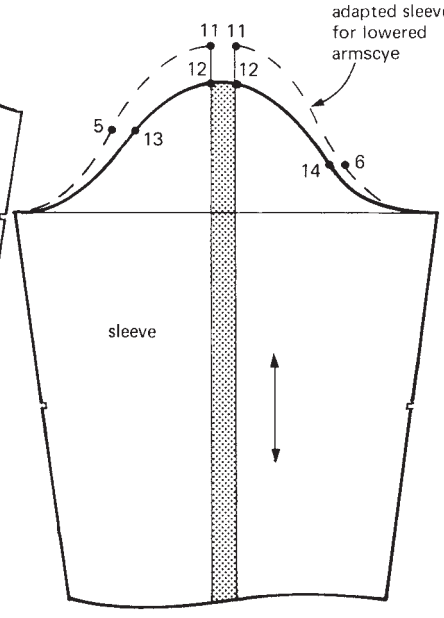


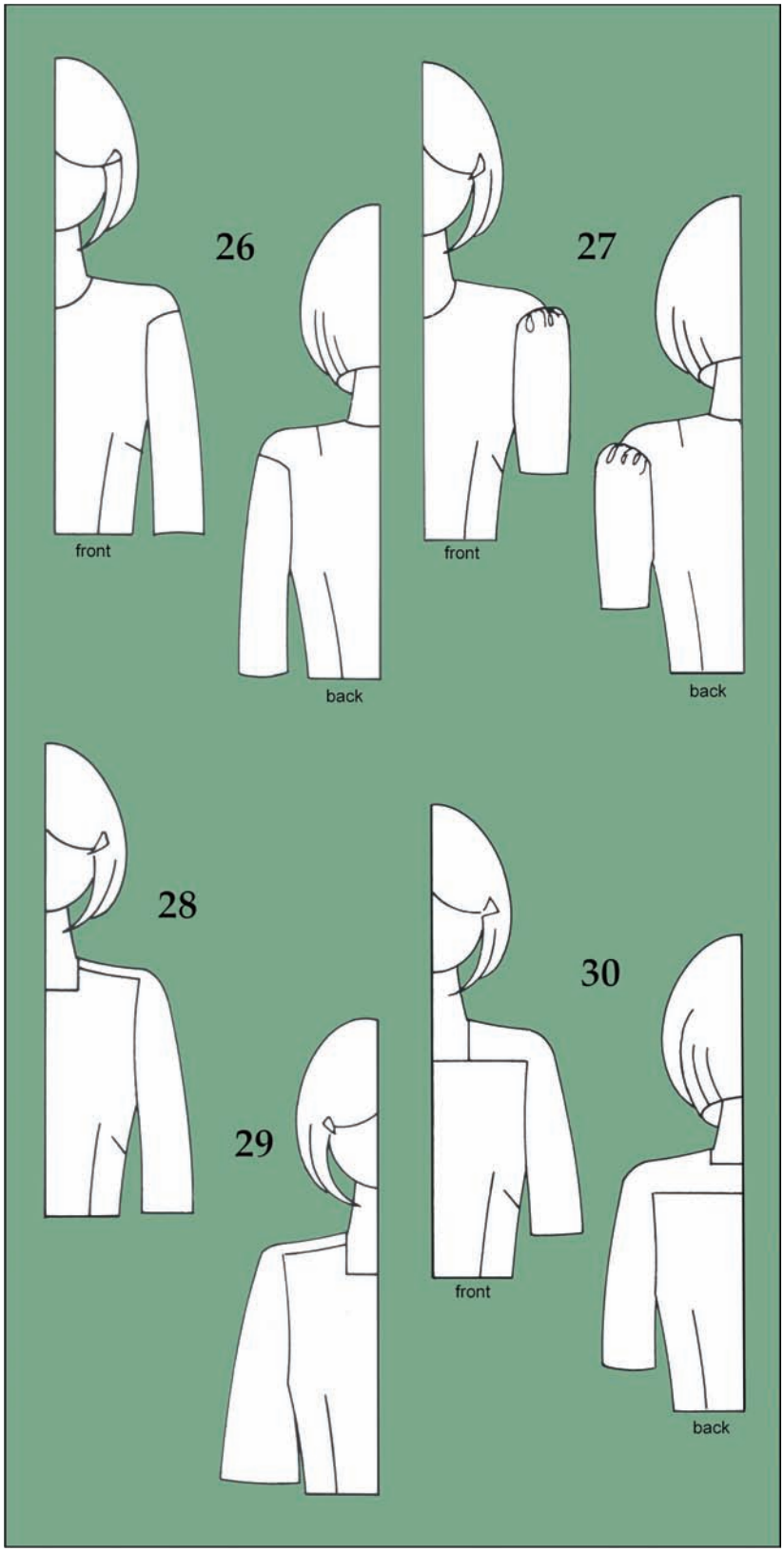


25 Dropped shoulder with lowered armscye









26 Dropped shoulder

Trace bodice and sleeve blocks. Mark balance points 1, 2, 3, 4. Extend shoulder to shape required. Mark balance points 5 and 6.
Make 7–3 equal the distance 1–5.
Make 8–4 equal the distance 2–6.
9 is down from the sleeve head, the amount shoulder is extended.
Draw sleeve head 7, 9, 8.
Widened Raise outer shoulders 1 cm. Widen centre sleeve 2 cm. Check the fit of the sleeve head.

27 Dropped shoulder with puff sleeve

Trace round bodice and short sleeve block. Adapt for a dropped shoulder. Divide sleeve into four sections and open required amount. Overlap each section 0.5 cm at bottom.
Raise sleeve head for extra fullness.

28 Extended sleeve

Trace round bodice and straight sleeve block to required length. Rub out back shoulder dart and remove 1 cm from back shoulder at armscye edge. Draw in neckline. Draw in shoulder strips 2.5 cm wide on back and front. Mark centre line of sleeve, extend it at the top.
Place back and front shoulder strips to this line.
Trace round, cut out.

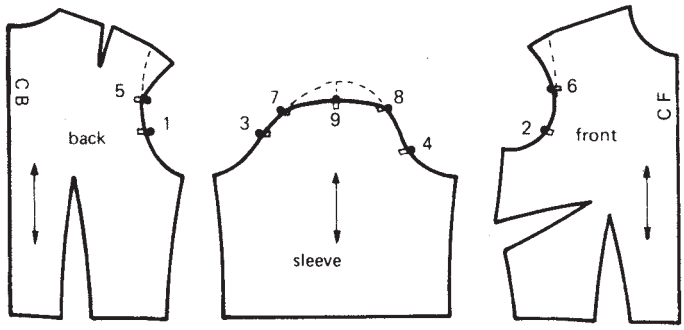
29 Flared extended sleeve

Diagram shows flared sleeve.

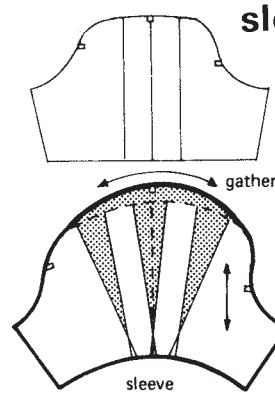
30 Extended sleeve with yoke

Trace round bodice and short sleeve block. Cut up centre line of sleeve. Draw neck. Draw yoke lines (maximum 12 cm from top of block), drop back yoke line 1 cm from dart to armscye. Raise shoulder 1.5 cm at armscye edges.
Place sleeves to bodices, match balance points, sleeve heads touching yoke line, and 1 cm from new shoulder points.
Trace round yoke and sleeve combined. Cut out, close back dart.
Trace round lower bodices.
One-piece sleeve Draw vertical line, place sleeves together at vertical line, to make shoulder dart.

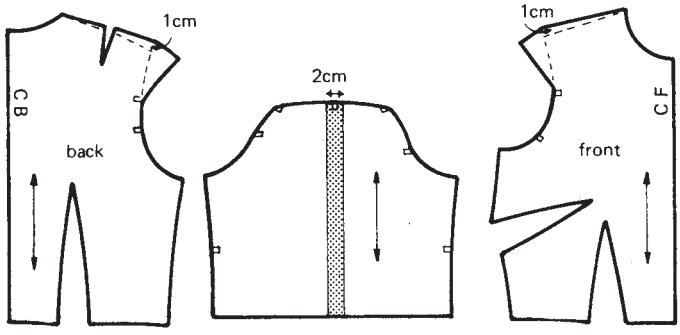
26 Dropped shoulder

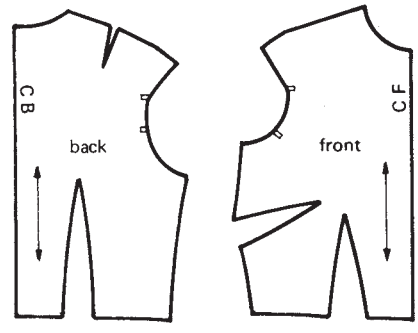


27 Dropped shoulder with puff sleeve

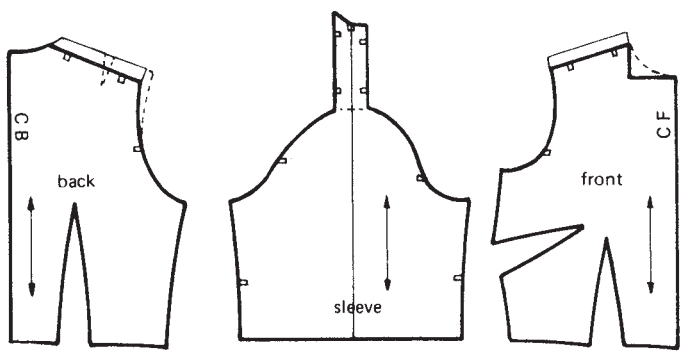


Widened

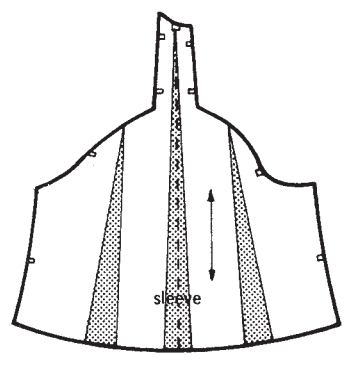




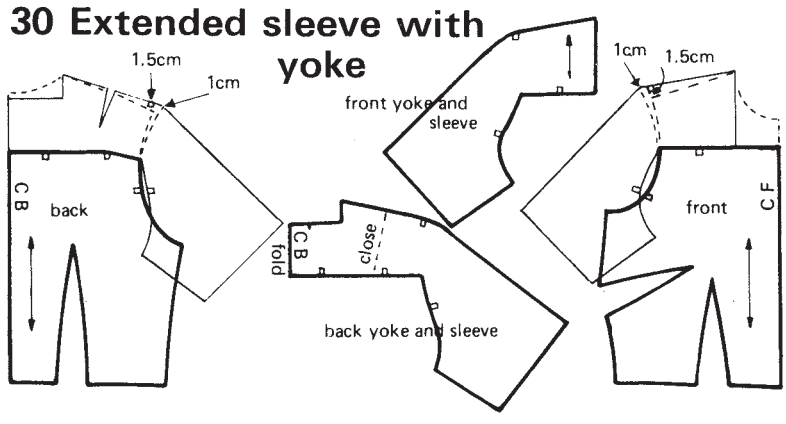
28 Extended sleeve



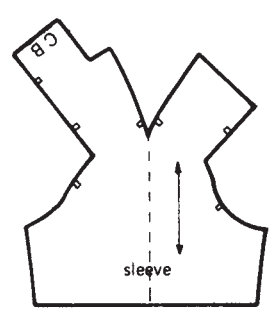
29 Flared extended sleeve

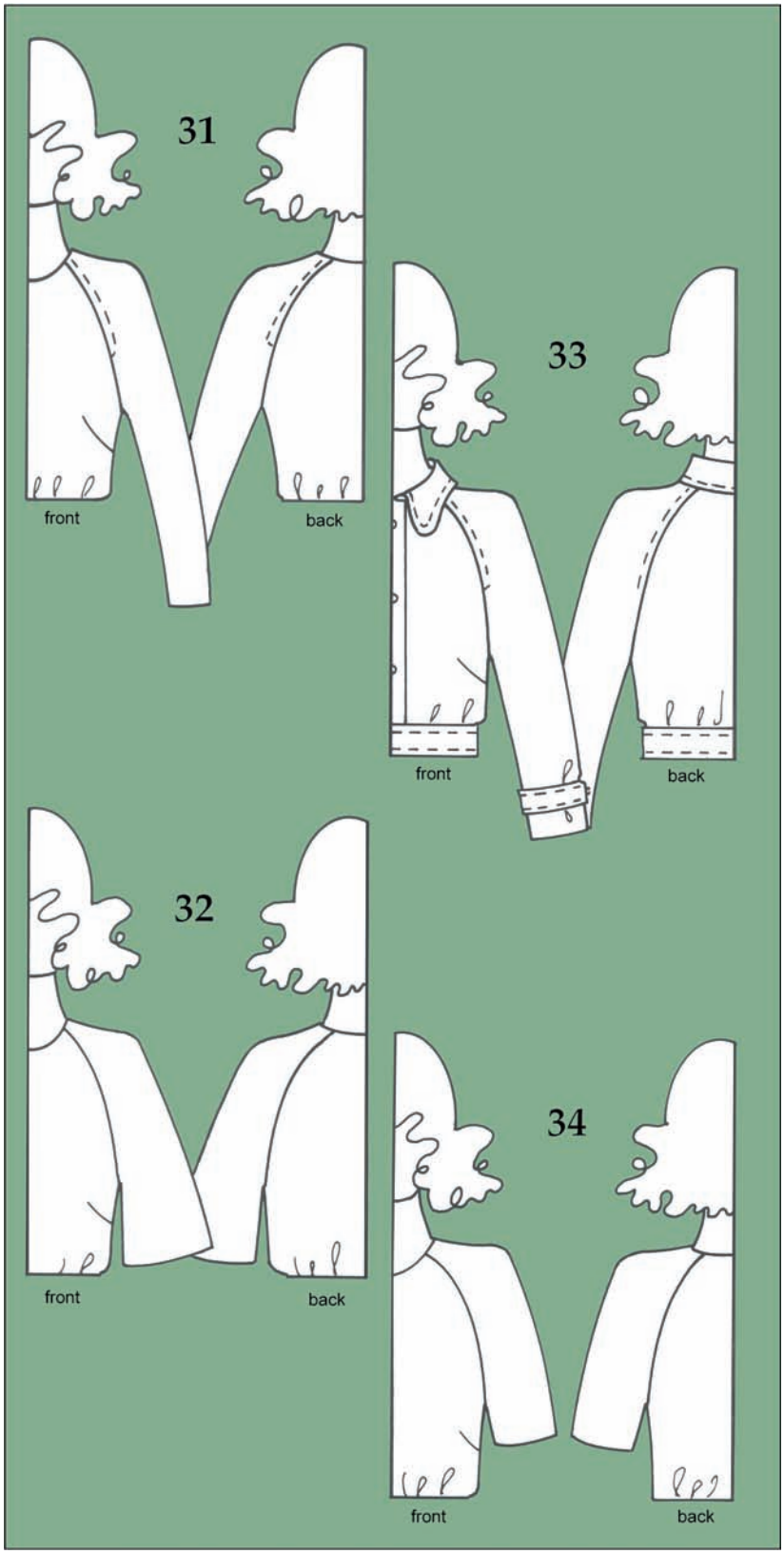


30 Extended sleeve with yoke



One-piece sleeve





31 Basic raglan sleeve

Trace round bodice block required and one-piece sleeve block. Take 1 cm off front shoulder line; add 1 cm to back shoulder line. Mark points 1 and 2, 3 cm in from new shoulder points. Place any back shoulder ease into dart. Move front balance points forward 3 cm. Mark balance points 3 and 4.
Join 1–3 and 2–4 with a curved line. Cut away sections.
One-piece sleeve Draw centre line of sleeve 1 cm forward. Mark point 5, 2 cm down from sleeve head.
Place sections to sleeve matching balance points, place shoulder points to sleeve head. Close back dart.
Trace round making a slightly shaped shoulder line to point 5.
Two-piece sleeve Divide sleeve at centre line, add 1 cm to each centre line; curve in to point 5.

32 Flared raglan sleeve

Divide one-piece sleeve into four sections. Cut, open required amount.

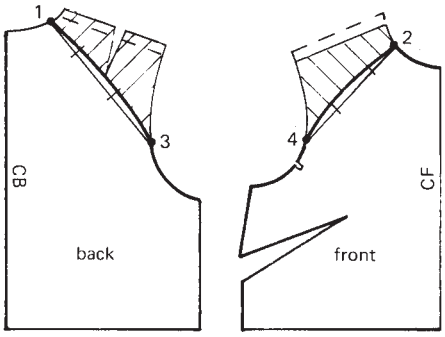
33 Deep raglan sleeve

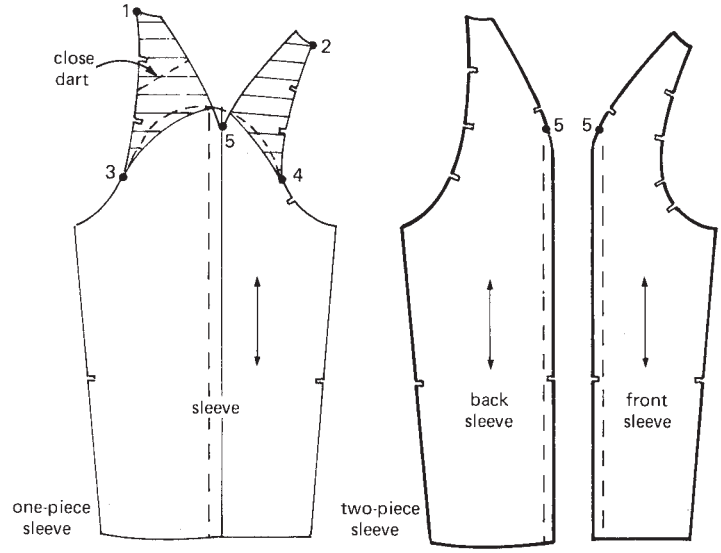
Trace round bodice block required and one-piece sleeve block. Place any back shoulder ease into a dart.
Add 2 cm to each bodice side seam.
Mark 4 at original front pitch point.
Use directions for classic raglan, but curve raglan lines below armscye line. Mark points 6, 7, 8, 9.
Sleeve Place sections to sleeve as above, note the way the underarm pieces lay on the sleeve, match balance points.
Draw a line below armscye line half the distance the bodice armscye has been lowered.
6–10 = 6–8, 7–11 = 7–9.
Join with curved lines. Cut out.
Draw straight lines from midway between 6–10 and 7–11 to 4 cm below underarm point.
Cut up the lines and open out 4 cm. Trace round.
For two-piece sleeve follow directions for basic raglan two-piece sleeve.

34 Raglan with square shoulder

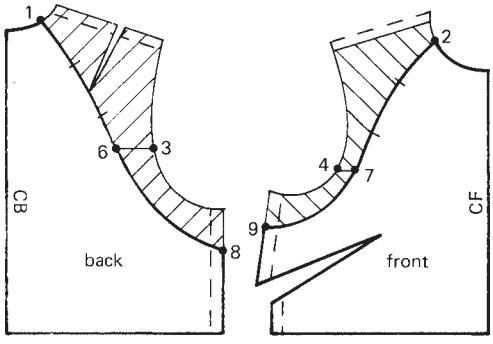
Draw lines from shoulder notch to raglan lines; open approx. 1.5 cm. Raise shoulder approx. 1 cm.

31 Basic raglan sleeve

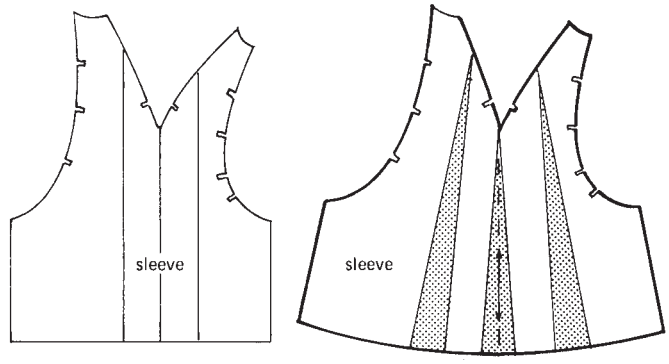




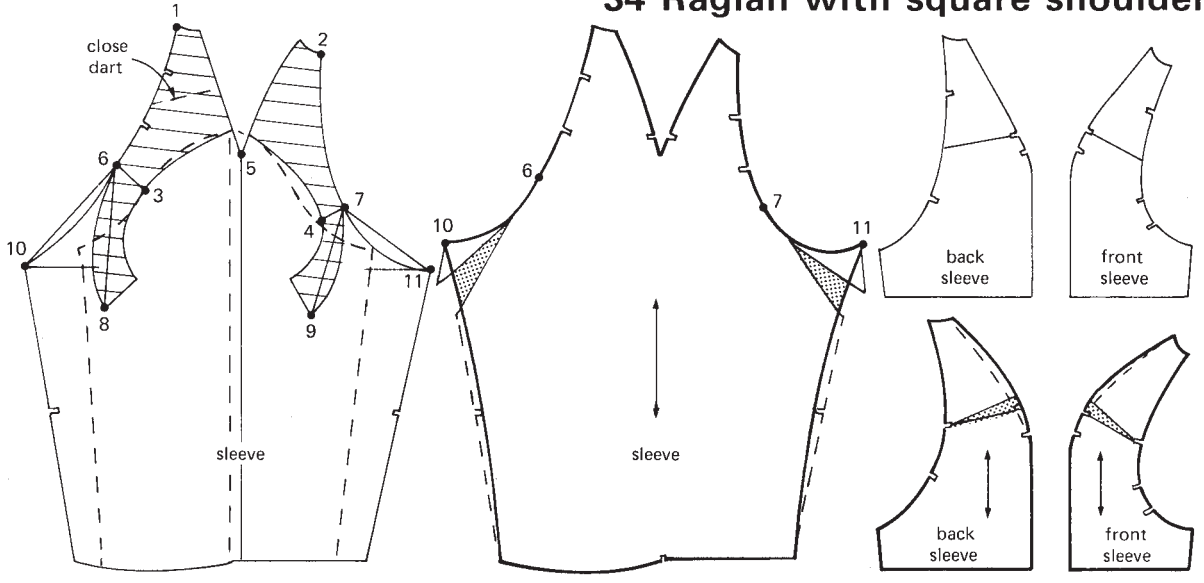
33 Deep raglan sleeve



32 Flared raglan



34 Raglan with square shoulder



The shaped kimono blocks

Kimono sleeves

Kimono blocks can be used for designs that vary from close fitting shapes to easier fitting shaped garments. The kimono adaptations in this chapter demonstrate designs that still retain the bust dart, using the close fitting block, the easy fitting block or the overgarment blocks.

For kimono designs based on a simple shape without darting see page 142 which demonstrates kimono shapes created by flat cutting with no bust dart shaping.

35 Basic kimono block

Trace round back and front sections of easy fitting bodice block or overgarment block as required.
Trace sleeve block, narrow underarm seam at wrist if required.
Back Mark points 0 and 1 on side seam; square out.
1–2 3.5 cm; square up to 3.
Mark 4 at shoulder point, 5 at neck point.
Divide the sleeve block down the centre line.
Place back sleeve head to touch shoulder point 4 and underarm of sleeve to touch line 2–3. Mark point 6.
0–7 one third the measurement 0–1 minus 0.5 cm.
Join 7 to wrist point 8.
7–9 6 cm.
7–10 6 cm; join 9–10 with a curve.
4–11 1.5 cm; join 5–11 and 11–12 at wrist point.
Front Transfer bust dart from shoulder to waistline.
Mark points 13 and 14 on side seam.
13–15 3.5 cm.
14–16 3.5 cm; join 15–16.
Mark point 17 at shoulder point, 18 at neck point.
16–19 the measurement 3–6 on back section. Place underarm of front sleeve to point 19 and the sleeve head to shoulder (it will rise above shoulder point).
14–20 the measurement 0–7; join 20 to wrist point 21.
20–22 6 cm.
20–23 6 cm; join 22–23 with a curve.
17–24 1.5 cm; join 18–24 and 24–25 at wrist point.
Transfer bust dart to position required.

36 Close fitting kimono block

Trace round close fitting bodice block and one-piece sleeve block. Divide sleeve down centre line.
Construct as basic kimono block with the following alterations: 0–7 and 14–20 quarter measurement 0–1 minus 0.5 cm. Draw a line 8 cm long from centre of underarm (directed towards the neck).
Gusset Draw a horizontal line; mark points 1 and 2, 13 cm apart. Draw a vertical line midway between 1 and 2, draw lines from 1 and 2, 8 cm long, to touch the vertical line above and below. When the block is completed transfer bust dart to required position.
For waist shaping refer to page 29.

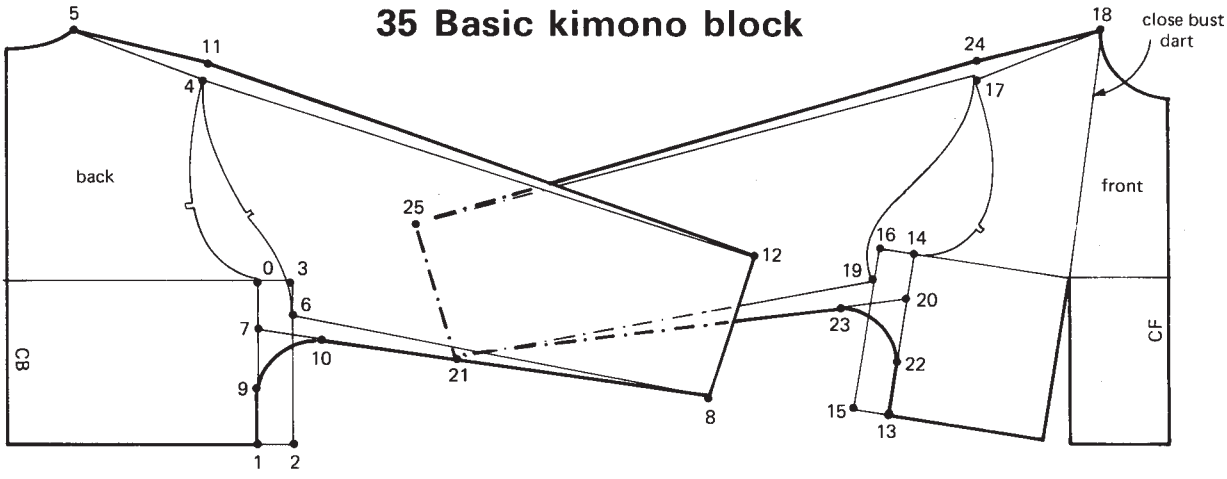
37 Easy fitting kimono block

Use the easy fitting bodice block or overgarment block.
Construct as for basic kimono block with the following minor alterations.
Add 2.5 cm to the side seam and mark points 0 and 1 and 13 and 14 on the new side seams.
Make 0–7 one third the measurement 0–1 plus 1.5 cm.

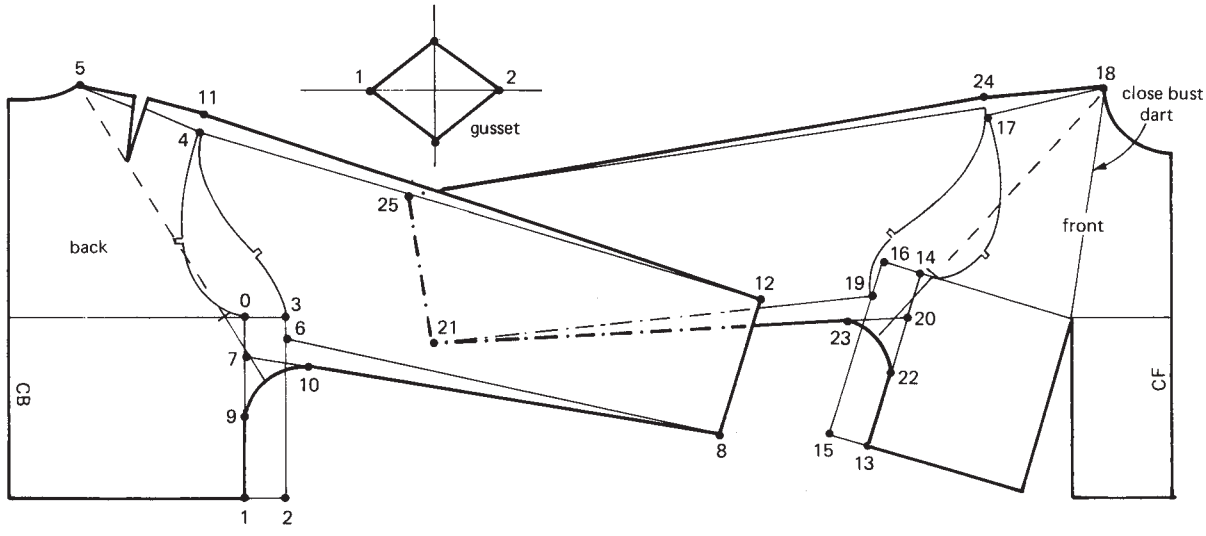
Shoulder adaptation

The shoulder line can be brought forward to give a good line at shoulder. For this adaptation the basic block is adapted before drafting a kimono block.
Body section Take 1 cm off front shoulder line; add 1 cm to back shoulder line.
Sleeve Draw centre line of sleeve 1 cm forward.

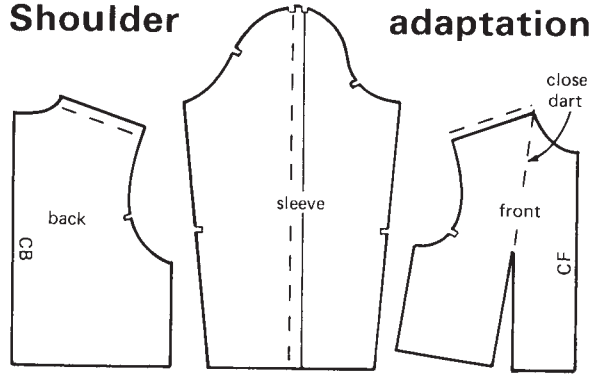
35 Basic kimono block

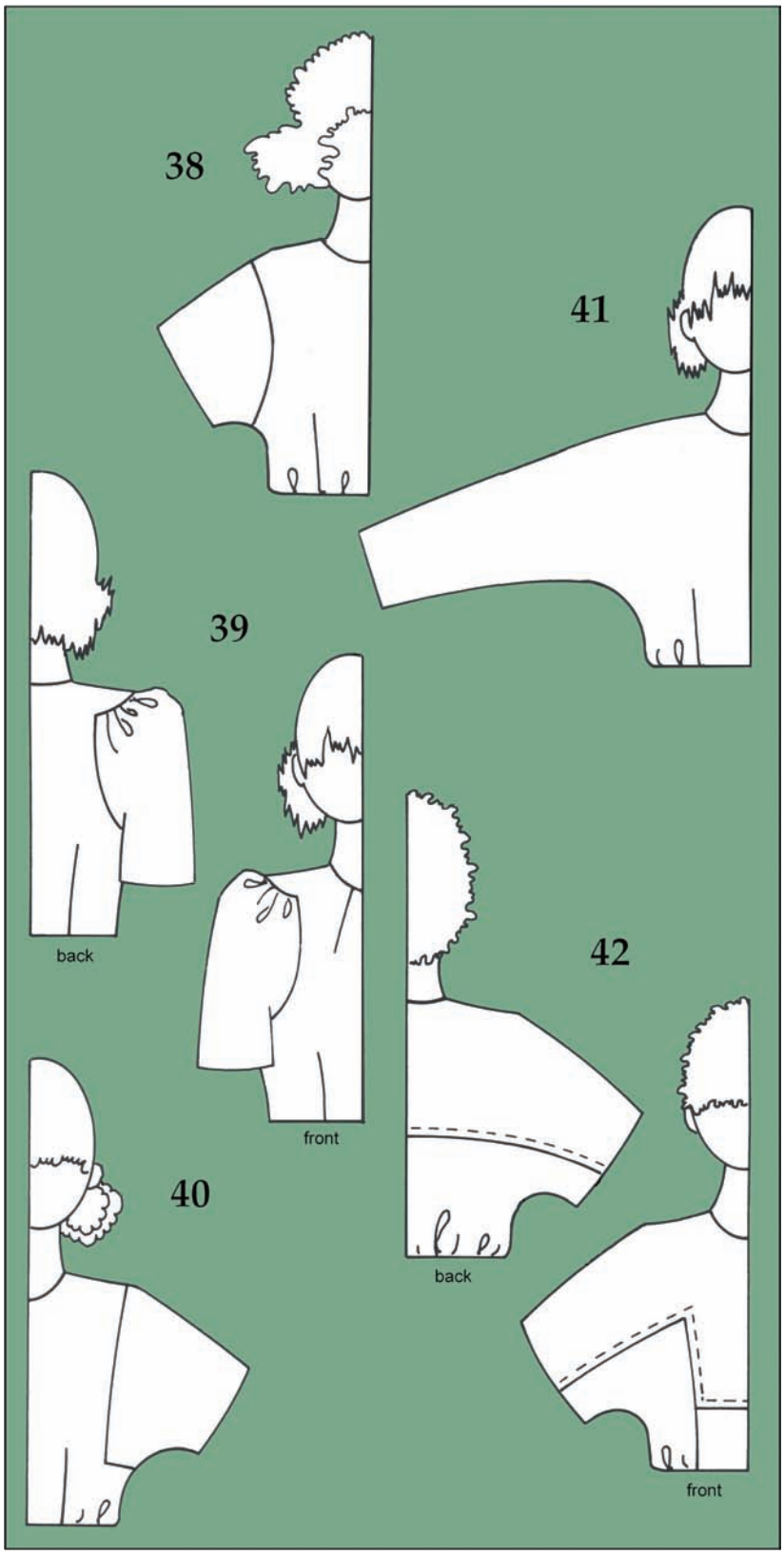


36 Close fitting kimono block



Shoulder adaptation





38 Dolman sleeve

Trace round kimono block required; mark points 10 and 23.
Draw in armscye shape to centre of underarm curve (the distance from shoulder notch should be the same on back and front sections).
Remove shaped sections (1.5 cm wide) two thirds length of front armscye, three quarters length of back armscye. Mark balance points at centre of sections. Draw lines from balance points to points 10 and 23.
Cut off sleeve sections, join at centre.
Cut up gusset lines and open 4 cm.
Trace sleeve, raise sleeve head 0.5 cm.

39 Shaped sleeve

Example shows adapted dolman sleeve based on close fitting kimono block. Construct dolman sleeve with shaped armscye required.
Divide top edge of sleeve into four sections and open amount required.
Raise sleeve head approx. 1.5 cm.
Direct back shoulder dart to armscye shaping, close dart.

40 Square armscye

Trace round kimono block required.
Draw in square armscye to centre of underarm curve.
Remove shaped sections from armscye as for dolman sleeve.
Draw lines from balance points to centre of underarm curve.
Complete sleeve as for dolman sleeve.

41 Batwing

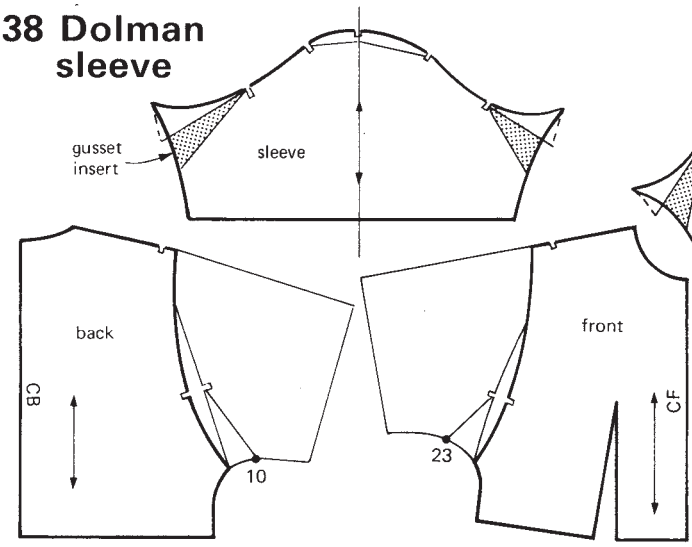
Trace kimono block required.
Draw line from centre of underarm curve to neck.
Cut along line, open required amount.
Redraw underarm curve.

42 Kimono style with yoke

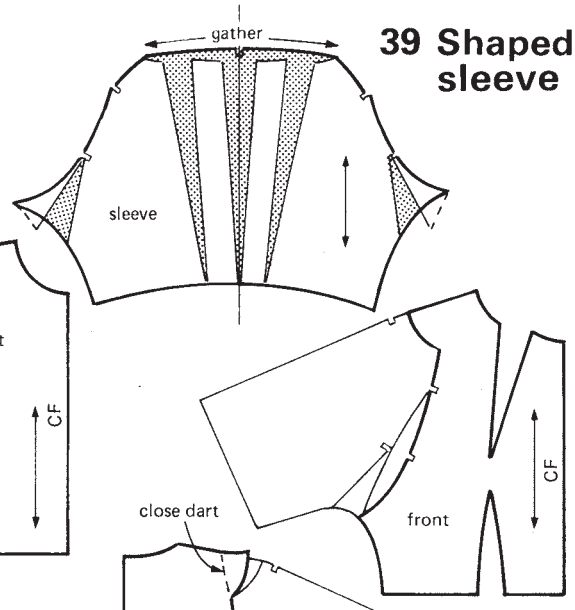
Trace round kimono block required.
Draw yoke lines, extend down sleeves.
Draw in lines from underarm to yokes (directed towards neck point).
Trace round each pattern piece.
Insert 4 cm gusset shape at underarm.

Note Designs with extra body fullness or based on the wide kimono block do not require a gusset insert.

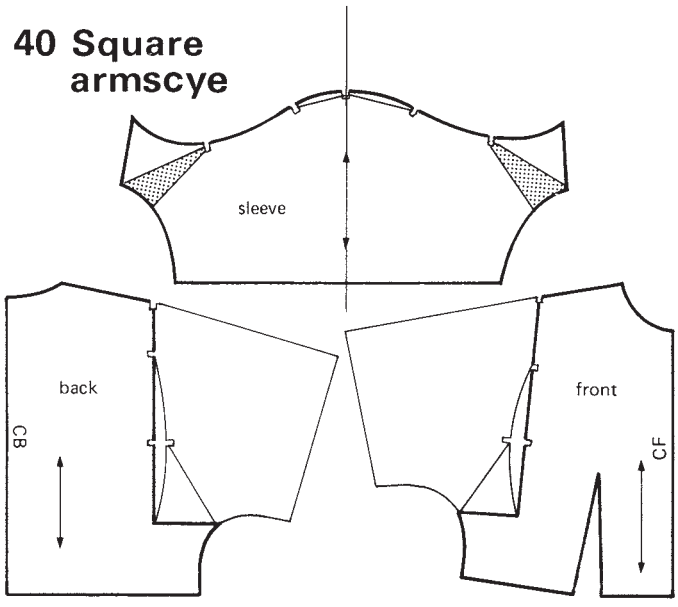
38 Dolman sleeve



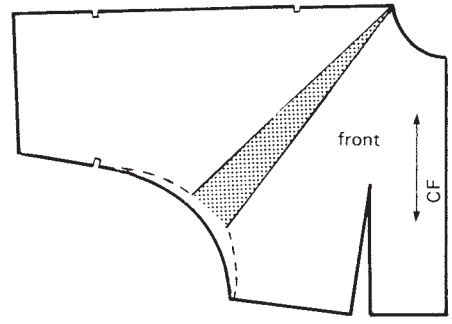
39 Shaped sleeve



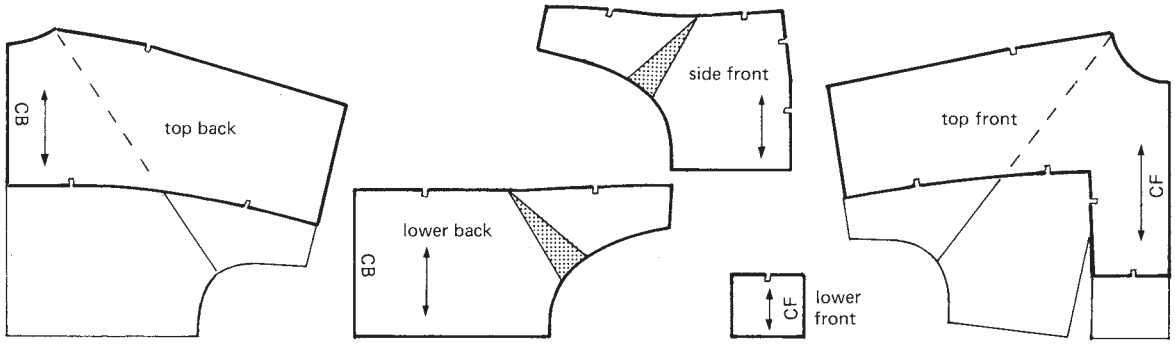
40 Square armscye

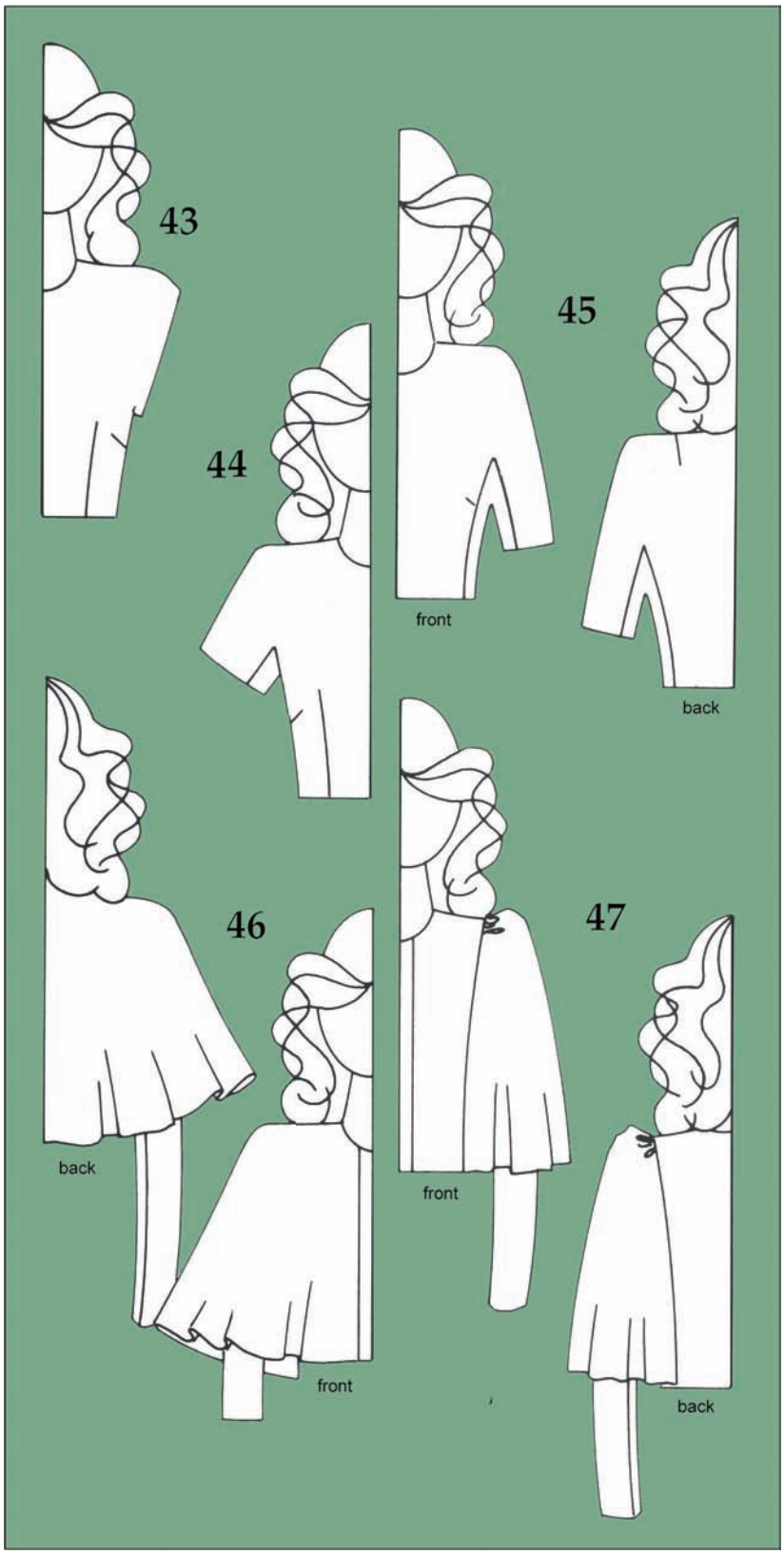


41 Batwing



42 Kimono style with yoke





43 Cap sleeve

Trace block required, raise shoulder 1 cm. Mark balance points 3 cm below armscye. Extend shoulder to width required. Draw in outer edge of cap with a smooth line.

44 Cap sleeve with gusset

Trace kimono block required with short sleeve (shoulder length approx. 32 cm), without curve at underarm. Widen sleeves 1 cm. Draw a line from underarms (directed at centre shoulders), mark points 1 and 2, 7 cm along line. Mark points 3 and 4, 4.5 cm in from sleeve underarm seam. Cut out sections.
Gusset Draw vertical line, place underarm seams of sections to this line. Join 1 to 2. Construct a triangle shape equal to the one formed above the line. Cut out.

45 Cap sleeve with panel

Construct 'cap sleeve with gusset' pattern (no waist darts). Transfer bust dart to neckline. Draw in panel lines. Draw waist darts on them.
Cut away the four sections. Close neck dart, cut out bodice patterns.
Panel with gusset Draw round gusset. Place sections 1, 2, 3, 4 round gusset as shown. Trace round.

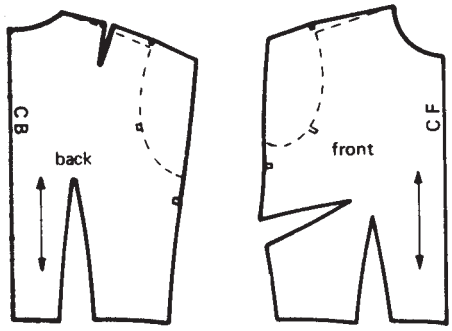
46 Flared cape

Trace kimono block required. Transfer bust dart to neckline. Draw in cape. Mark front strap line and cut away. Drop vertical lines from back neck and shoulder; from front shoulder and bust point.
Cut out. Cut up lines.
Close bust dart, open other lines to make the same amount of flare. Trace round.

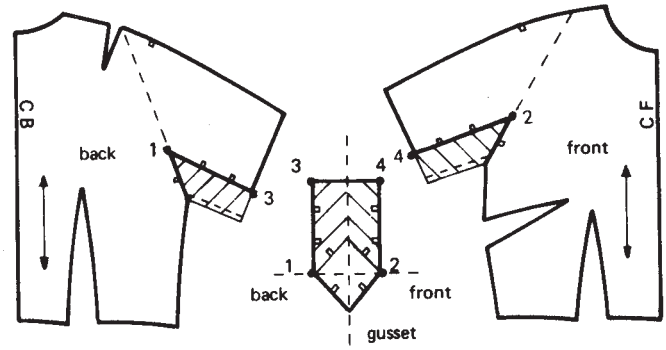
47 Fitted cape

Draft a kimono pattern from block required, make sleeve overlap side seam 2.5 cm. Draw in panel lines. Draw in cape.
Divide cape sleeve head into sections. Cut off panels.
Cut up sleeve head sections.
Draw vertical grain line.
Place centre sleeve lines to this line, raise head sections as shown. Trace round.

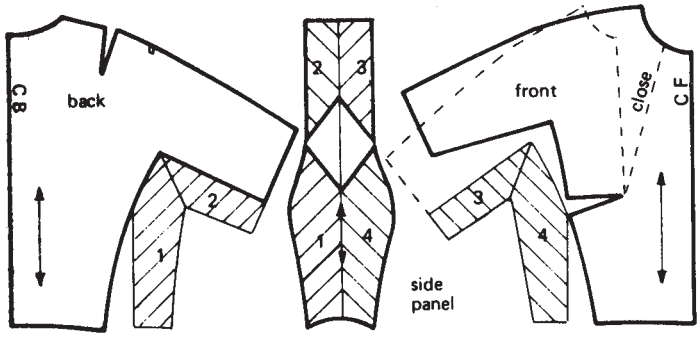
43 Cap sleeve

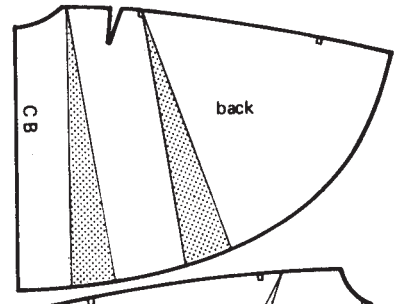


44 Cap sleeve with gusset

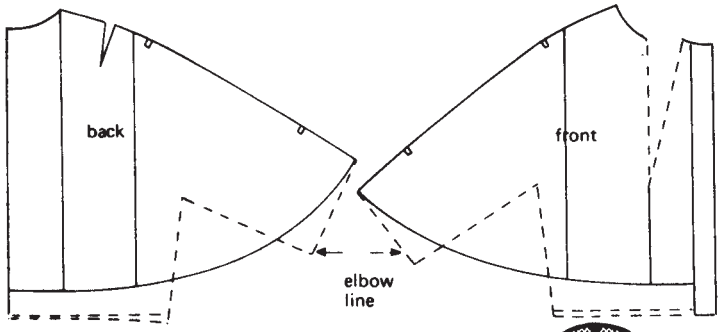


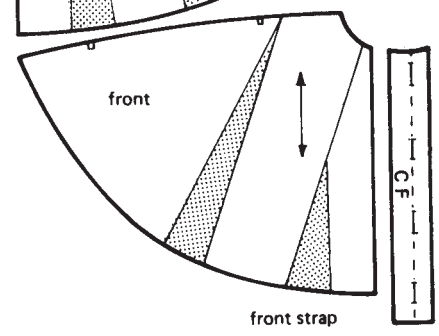
45 Cap sleeve with panel



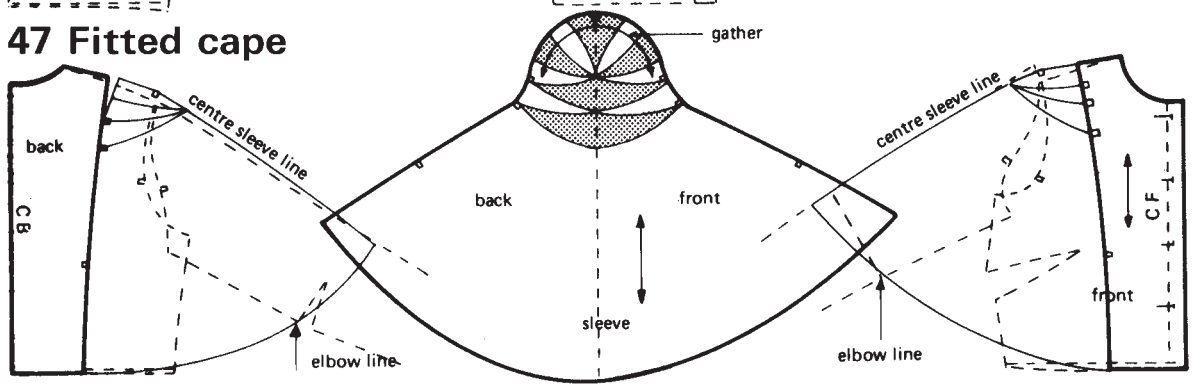


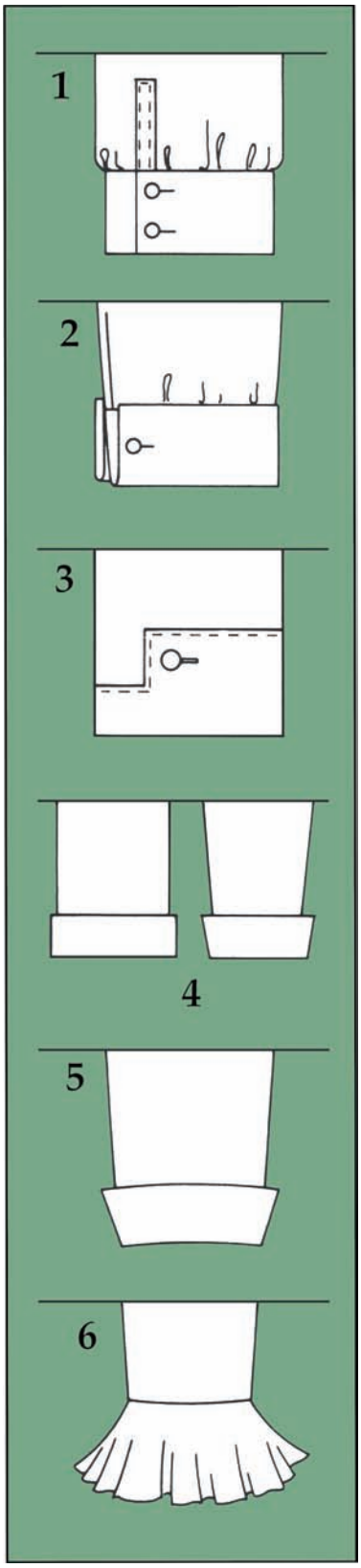
46 Flared cape





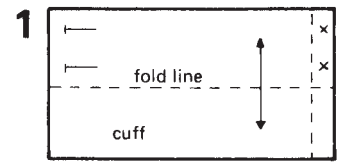
47 Fitted cape



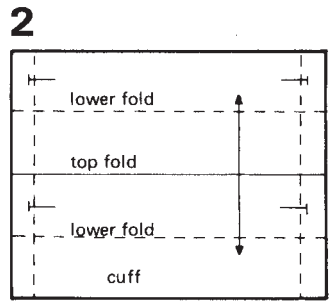


Cuffs

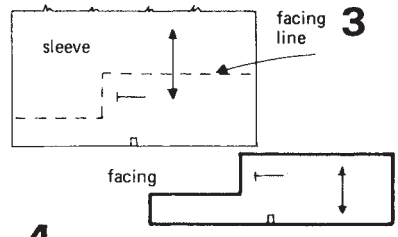
Shirt cuff
Draw rectangle twice the depth of finished cuff; width = wrist measurement plus 5 cm, plus 1.5 cm underwrap for buttons. Mark buttonholes and button points.



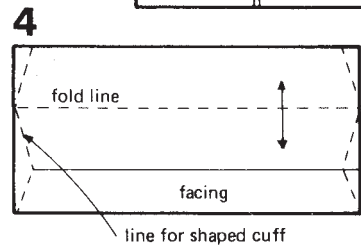
Double shirt cuff
Draw cuff with buttonstand at both ends. Mark buttonholes. This cuff is drawn four times the depth of the finished cuff. Mark fold lines as shown.



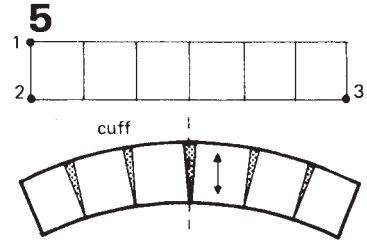
Sleeve facing
Trace round lower edge of sleeve. Lower edge of sleeve must be even. Draw in line of facing on sleeve.
Wheel through onto new paper. Cut out and mark buttonhole.



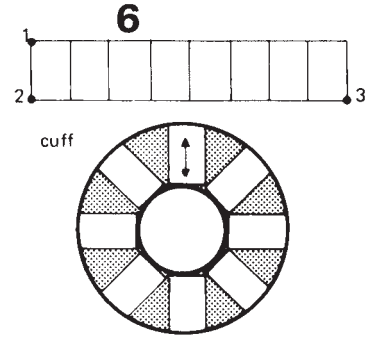
Straight cuff with facing
Draw a rectangle, width of sleeve bottom and twice the depth of finished cuff.
Add a facing to lower edge (depth approx. 3 cm).



Shaped cuff
Draw a rectangle 1–2 = depth of finished cuff, 2–3 = width of bottom of sleeve.
Divide into six sections.
Cut out, open out at top edge to width required at top of cuff.
Trace round, cut out.



Frilled cuff
Draw a rectangle, 1–2 = depth of finished cuff; 2–3 = width at the bottom of sleeve.
Divide into eight sections.
Open out the sections until they make a complete circle.
Trace round, cut out.



PART ONE: CLASSIC FORM CUTTING

5 Constructing collars

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1 Peter Pan (flat) collar 70
2 Eton collar 70
3 Flat collar with low neckline and slight stand 70
4 Sailor collar 70

Standing collars 72
5 Mandarin collar 72
6 Standing straight collar 72
7 Polo collar 72
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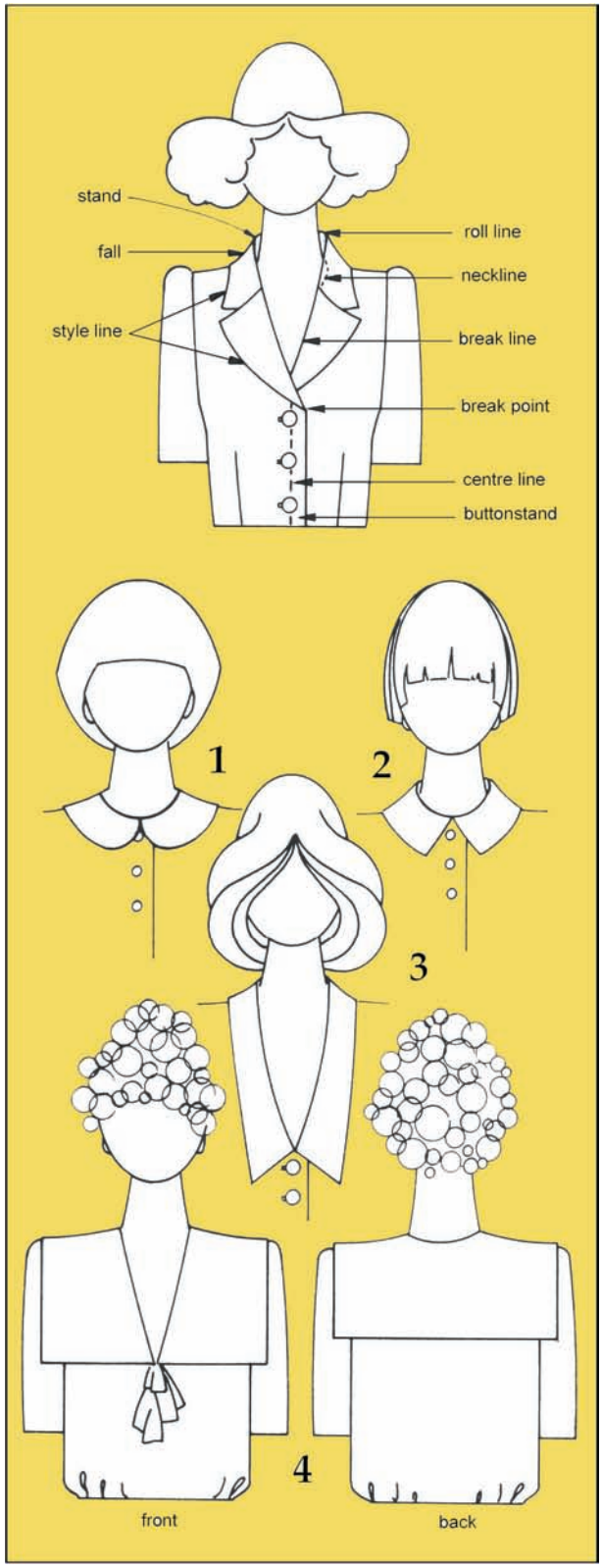


Collars – General principles

Terms Used when constructing collars.
Neckline The line where collar is joined to neck.
Style line Outer edge of collar or rever.
Roll line The line where collar rolls over.
Stand Rise of the collar from neckline to roll line.
Fall Depth of collar from roll line to style line.
Break point Where the rever turns to form lapel.
Break line Line along which lapel rolls back.
Before drafting a collar Lower neckline if required, mark buttonline, buttonholes, buttonstand.
After drafting a collar Add 0.25 cm to outer edge of top collar and from point 1–2 as shown in diagram. This ensures that seam line of outer edge of collar will not show when made up, and the back neck of collar will sit properly. Add 0.5 cm for thick fabrics.
Special note Diagram opposite shows a principle that applies to the making of all collars. When drawing the style line, allow for depth of collar stand. Experiment on a dress stand or figure for final effects.
Collar types Collars fall into four basic groups:
flat collars sit flat (or almost) around shoulders;
standing collars stand up around the neck or stand, roll over, then fall;
collars cut in one with the garment; collars with revers, separate collar and rever.

Flat collars

1 Peter Pan (flat) collar

Place shoulder of back bodice to shoulder of front bodice, neck points touching, outer shoulders overlapping by 2 cm.
Draw in collar shape. Wheel off collar.

2 Eton collar

Construct a Peter Pan collar. Divide collar into six sections. Cut out, cut up lines, overlap at outer edge 0.75 cm.
Trace round collar with a smooth line.

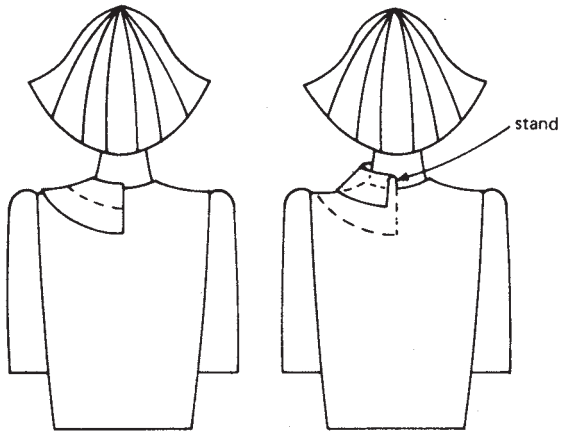
3 Flat collar with low neckline and slight stand

Trace front bodice, draw in neckline. Take 0.6 cm dart out of neckline (ref. Low revers, page 74). Place back shoulder to front shoulder, neck points touching. Draw in collar. Wheel off collar. Divide into five sections, cut up lines, overlap 1 cm at outer edge of collar. Trace round collar.

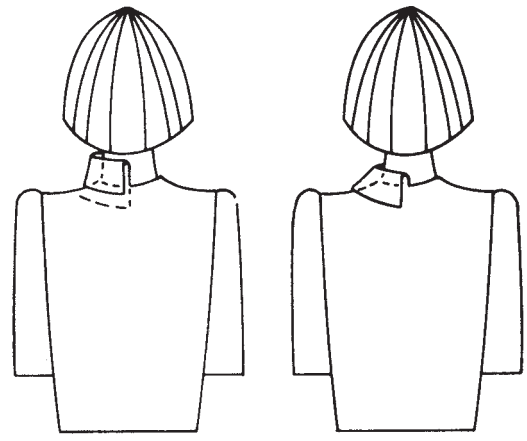
4 Sailor collar

Place back bodice to front bodice as for Peter Pan collar. Draw in 'V' neckline. Draw in collar as shown. Wheel off pattern and cut out.

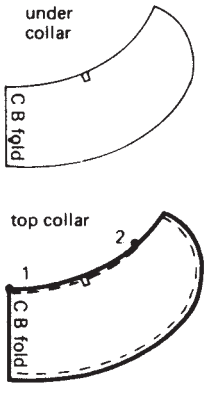
If the outer edge of a flat collar is reduced
it sits higher in the neck, increasing the stand



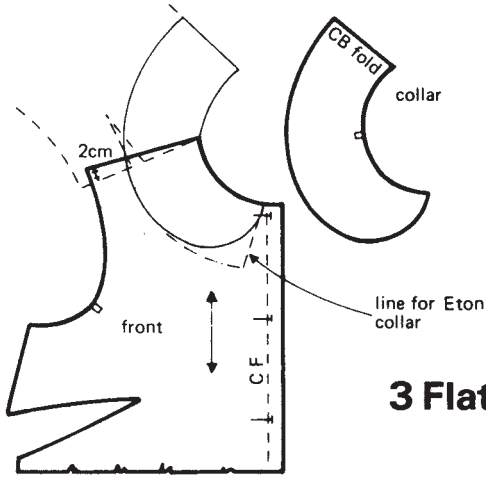
If the outer edge of a standing collar is widened
it sits lower at the neck, reducing the stand



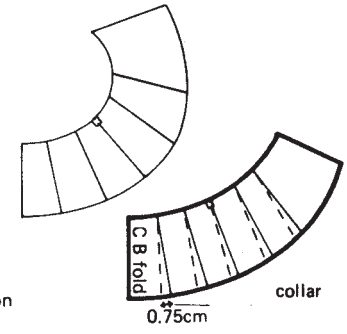
Top Collars



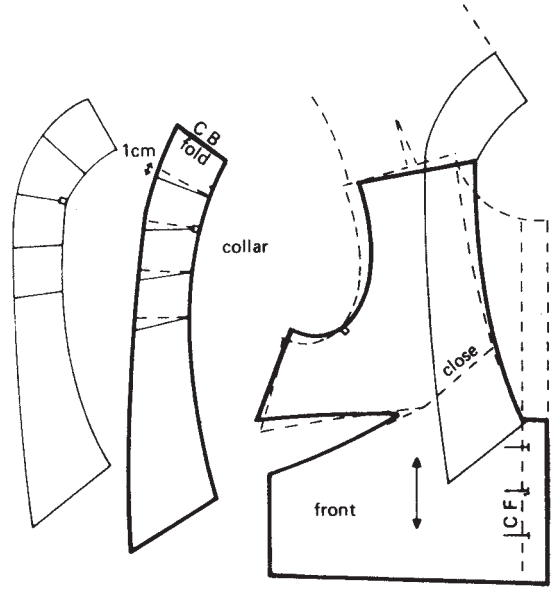
1 Peter Pan collar



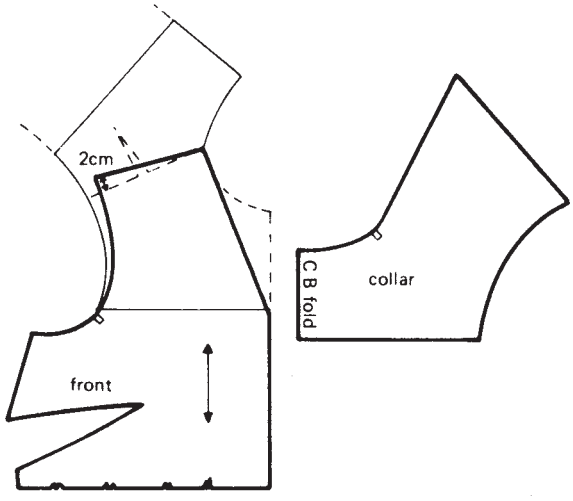
2 Eton collar

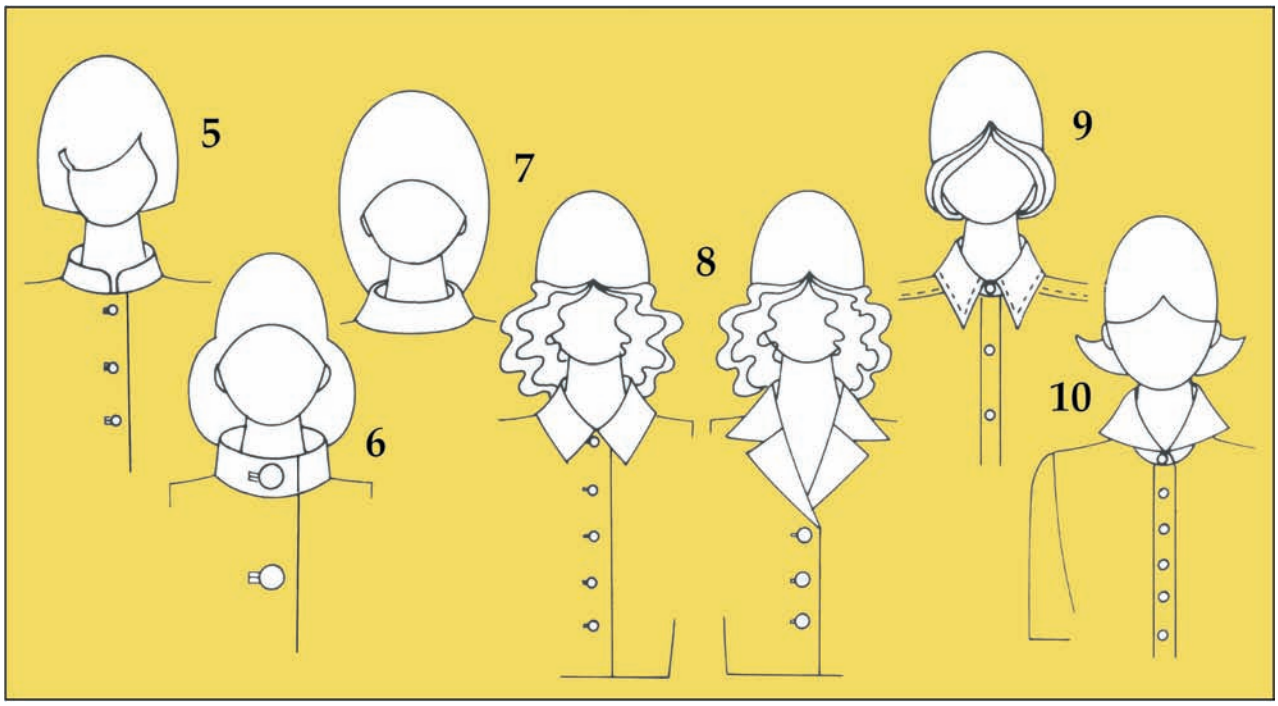


3 Flat collar — low neck



4 Sailor collar





Standing collars

Measure the neck If neckline requires lowering, complete this, then measure neckline. Standing collars must be measured accurately with tape upright (see diagram). Place back to front with shoulders touching; measure from centre back to centre front for half neck measurement.

5 Mandarin collar

1–2 full neck measurement, 2–3 approx. 4 cm. Draw rectangle. Curve outer edges. Mark centre back. Divide into six sections, cut out. Cut up four outer lines, overlap 0.5 cm. Trace round.

6 Standing straight collar

Lower neckline approx. 1 cm at centre back and shoulders and 2.5 cm at centre front. Measure new neckline.
Square both ways from 1. 1–2 half neckline measurement.
2–3 buttonstand; square up. 1–4 collar depth; square across to 5. 3–6 = 1 cm; 5–7 = 1.5 cm; join 6–7.
7–8 = measurement 2–3; join 2–8.
1–9 = half measurement 1–3; join 6–9 with a curve.

7 Polo collar

1–2 full neck measurement, 2–3 four times finished depth of fall. Draw rectangle. Mark centre front, fold line, roll lines. Cut collar on cross in woven fabrics.

8 Convertible collar

Construct rectangle 1–2 half neck measurement.
1–4 = collar depth approx. 9 cm.
3 is three quarters distance 1–2.
Shape neckline 0.5 cm up to 5. Shape to outer edge.
Changing the style line Square up from 3 to 6. The style line can be changed from 6 as shown in diagram.
Shaped collar – concealed stand Draft convertible collar. 1–7 = 3.5 cm, draw curved line from 7 to 3. Divide 1–3 into four sections. Cut out collar and stand. Cut up lines. Overlap stand at outer edge 0.2 cm on each line. Open outer edge of collar 0.4 cm. Cut 0.6 cm from centre back of collar. Trace collar and stand.

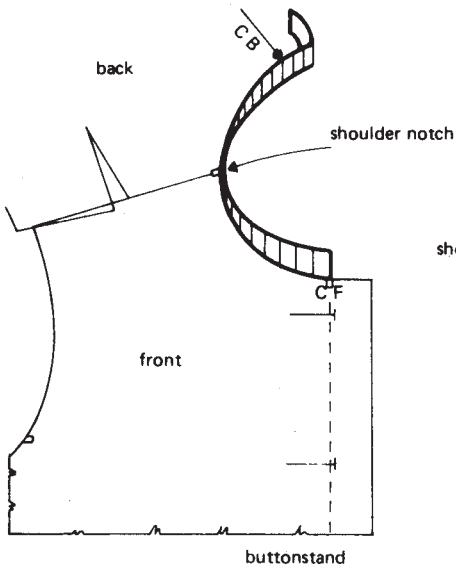
9 Shirt collar

Lower front neckline 0.5 cm (not shirt block).
1–2 = half neck measurement; square up.
1–3 = collar stand and depth measurement; square across.
1–4 = three quarters measurement 1–2; 2–5 = 0.5 cm.
1–6 = half measurement 1–3 minus 1 cm; square across to 7.
7–8 = 0.75 cm; draw in collar outline from 3–8.
5–9 = buttonstand; join 8–9 and 4–9 with curves. Mark buttonhole.
Separate stand Trace shirt collar. 6–10 = 0.75 cm. Shape line from 10 to line from 3. Trace collar and stand.
Shaped shirt collar Trace shirt collar and stand. Divide, shape them as for convertible collar and stand.

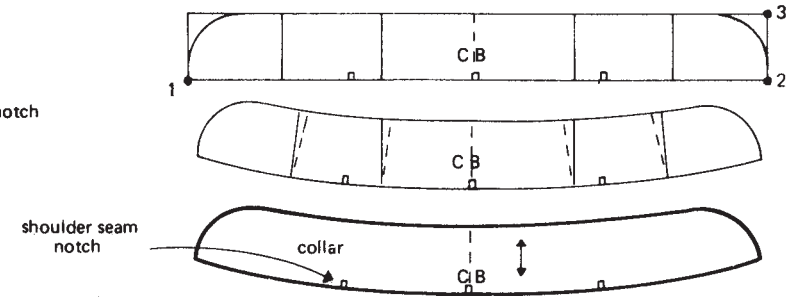
10 Wing collar

Construct the rectangle and stand for a basic shirt collar. Mark points 1, 2, 3, 4. 5 = half 1–4. Square up from 3–6. Draw in collar shape as shown.

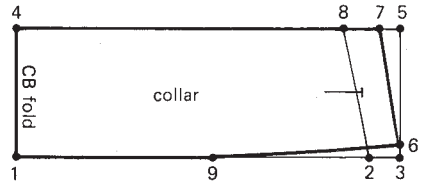
Measure the neck



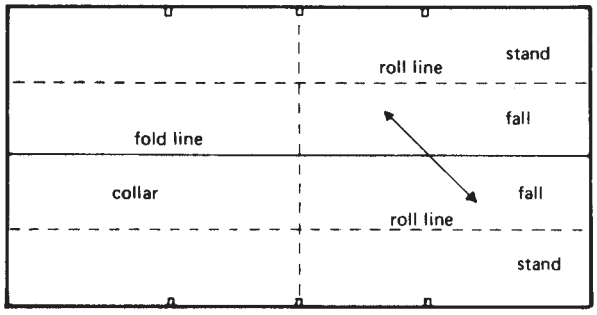
5 Mandarin collar



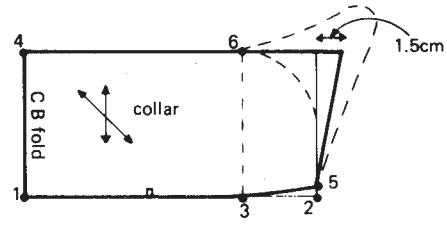
6 Standing straight collar

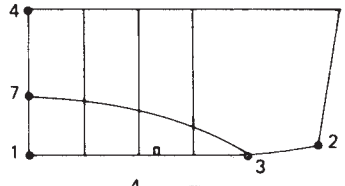


7 Polo collar



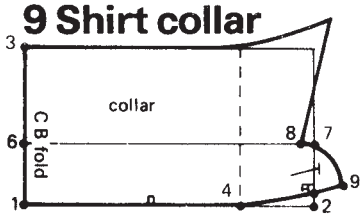
8 Convertible collar

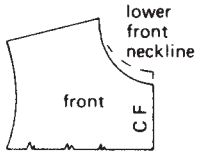


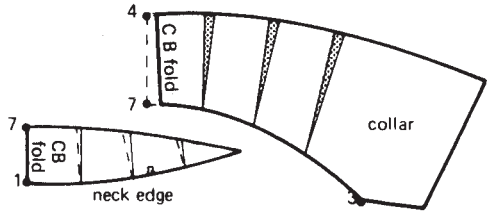


shaped convertible collar with concealed stand

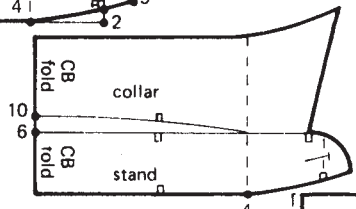
9 Shirt collar



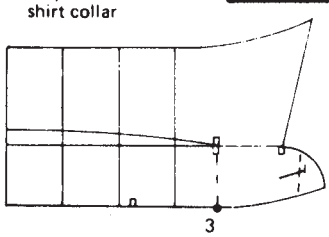


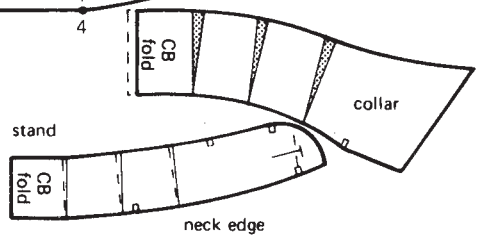


shirt collar with separate stand

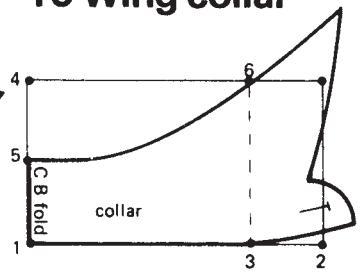


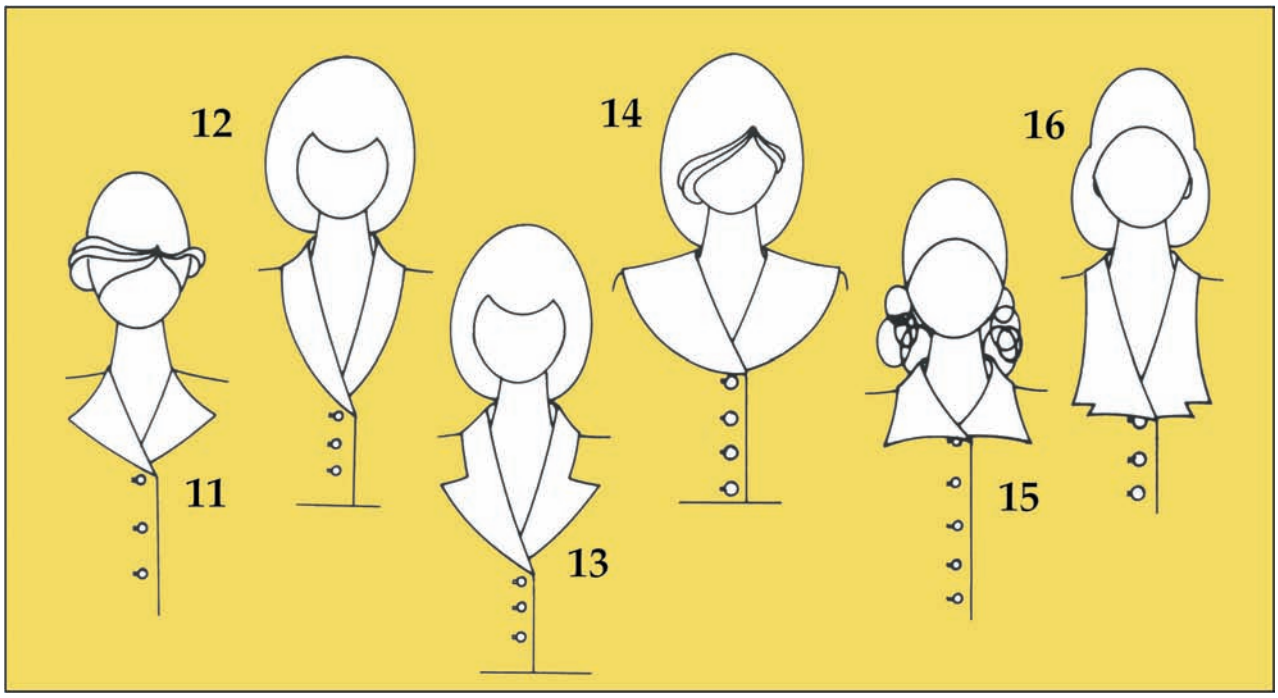
shaped shirt collar





10 Wing collar





Collars cut in one with the garment

Low revers

Before drafting close fitting collars with low revers, make 0.6 cm neck dart, transfer this to bust dart.

11 Rever front

Trace round front bodice, mark buttonholes, add buttonstand. Mark break point level with top buttonhole. Draw line from neck point to break point. Draw rever shape on bodice.
Fold along break line. Wheel through rever shape. Unfold, trace round pattern, cut out. Trace off facing. Add 0.25–0.5 cm to outer edge of rever facing.

12 Classic roll collar

Trace round front bodice (low revers – dart neck). Mark buttonholes, add buttonstand. Mark point 1 at break point, mark neck point 2. Extend front shoulder line. Place reversed back bodice to front bodice at neck point. Swing back so that the outer shoulder edge overlaps extended line by 8.5 cm. Mark back neck point 3.
2–4 = 2 cm, 3–5 = 3 cm, 5–6 = 6 cm, 6–7 = 0.5 cm.
Draw in roll line 5–4 and break line 4–1.
Draw in style line from 7–1.
Facing Trace off facing. Allow 0.25–0.5 cm at outer edge of collar. Divide facing below rever as shown. Place lower half of facing on the straight grain of fabric, the top half can have the centre back line placed to a fold.

13 Changing the style line

The outer line of the roll collar can be changed in many different ways to produce new designs.

14 Shawl collar

Collars that are wide around the shoulders and back must have smaller swing (e.g. 3 cm) so that the outer edge becomes wider. Continue as for roll collar.
Shawl collar with seam Draw a line from neck point to centre of overlap at collar edge.
Separate back collar.
Shape shoulder seam of front and back collar.

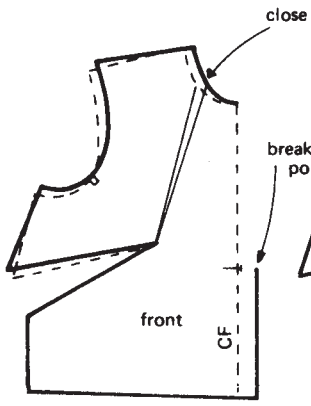
15 High shaped collar

Trace round front bodice, mark buttonholes and buttonstand. Mark break point 1 level with top button. Mark 2 at neck point, 2–3 = 1.5 cm.
Draw dart parallel to break line as shown.
Draft roll collar, use point 3 as neck point.
Draw in back of collar and shaped style line.
Trace off facing and complete as for roll collar.

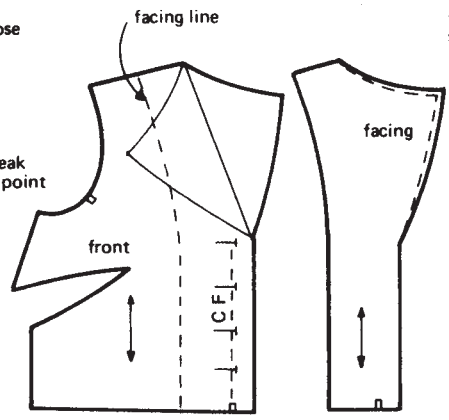
16 Hollowed neckline

Construct a classic roll collar draft. Draw in style line, example shows design with notch. Draw line from point 2 at neck to centre line 5 cm above top buttonhole. Draw in 1.5 cm dart on this line. Trace off facing including dart, complete as for roll collar.

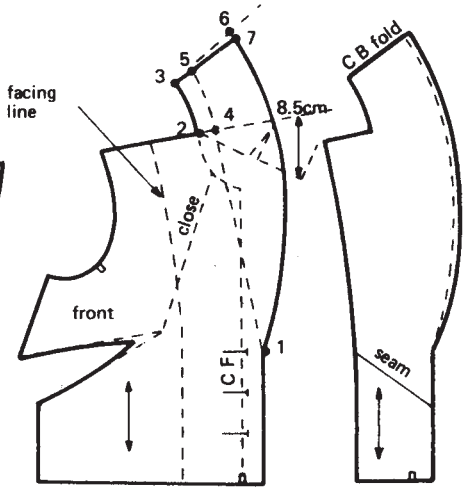
Low revers



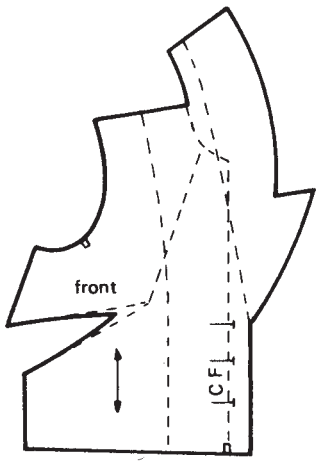
11 Rever front



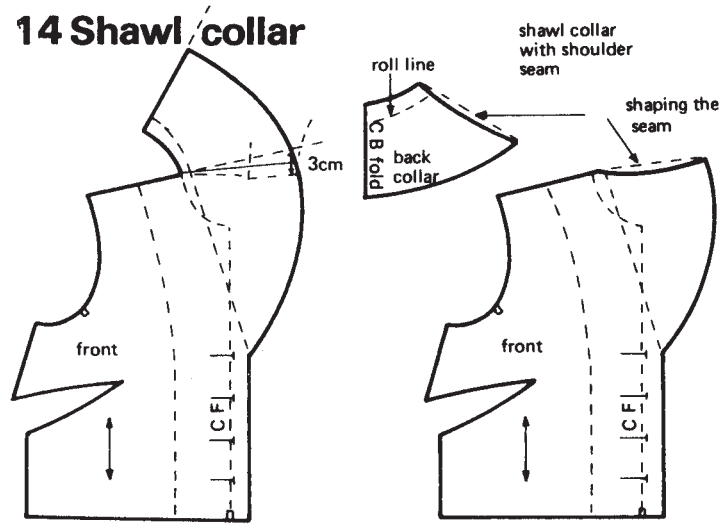
12 Classic roll collar



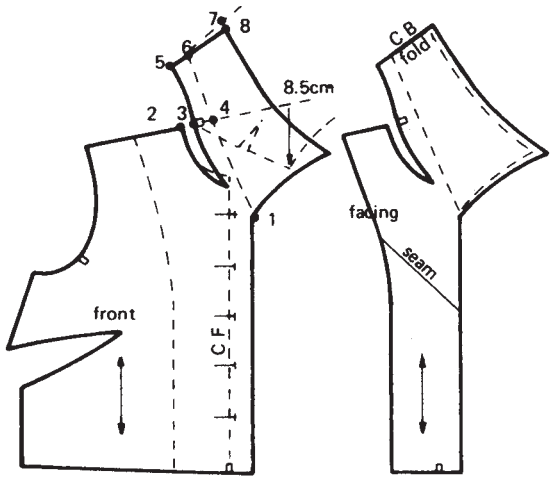
13 Changing the style line



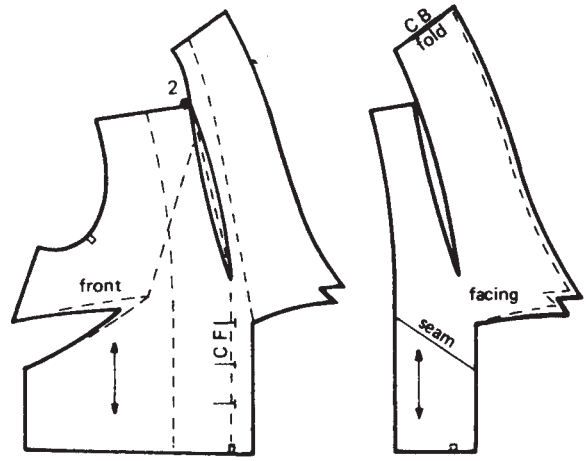
14 Shawl collar

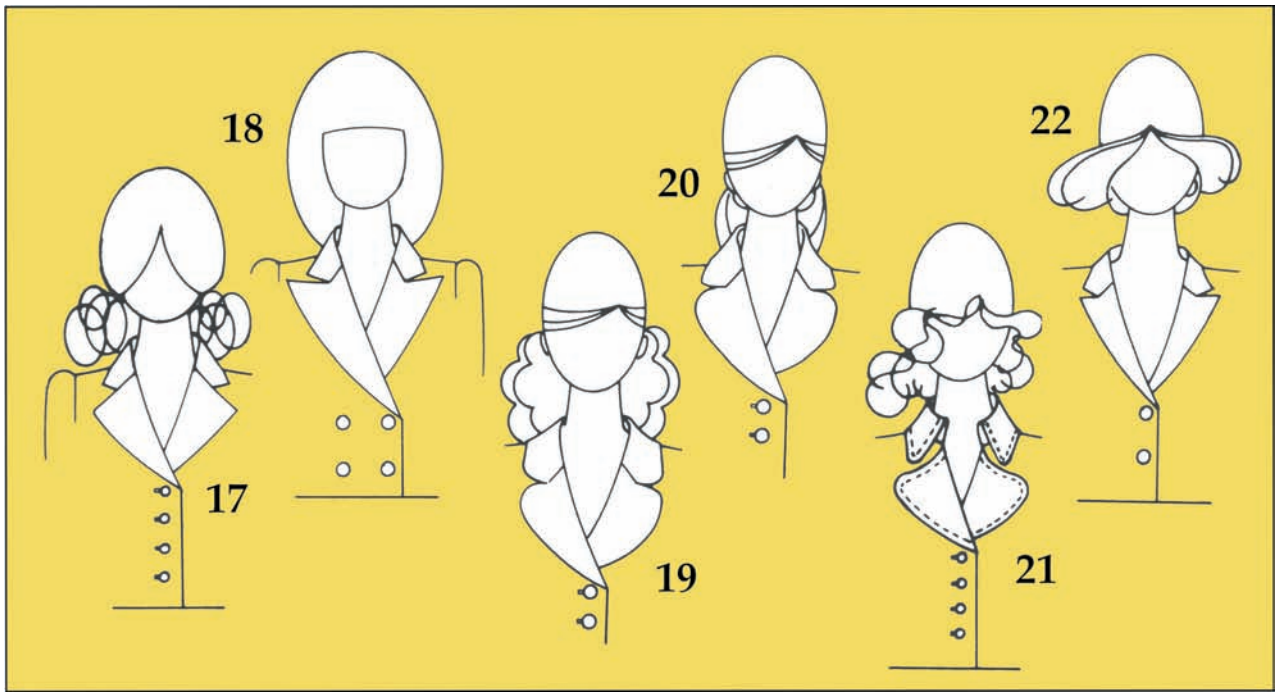


15 High shaped collar



16 Hollowed neckline





Collars with revers

For low revers make 0.6 cm neck dart (page 74).

17 Classic gents collar (tailored)

Trace round front bodice. Raise front neck 0.5 cm. Mark point 1, square across, rub out existing neckline. Mark in buttonhole, add buttonstand. Extend shoulder line. 2–3 = 2 cm along the line. Mark 4 at break point.
Join 4 to 3 with a dotted line, extend line. 3–5 = back neck measurement plus 1 cm.
5–6 = 2 cm (6–3 is same measurement as 5–3). Square a line across at right angles to the line 6–3.
6–7 = 3 cm, 6–8 = 5 cm. From 7 draw a line parallel to 6–3. 9 = 1.5 cm up from the line from 1.
Draw in neckline 2, 9, 1 and rever outline as shown (check shape by folding along break line).
Draw in collar 1, 9, 7, 8 and outer style line.
Draw in roll line from 6 to break line.
Mark balance points on neck and collar.
Top collars and facings As under collars on tailored garments are cut on the cross and shaped with the iron, cut top collars from shaped under collar, add the extra amounts to outer edges (page 70). Add 0.5 cm to rever on facing from break point to collar point.

18 Classic reefer collar (tailored – double breasted)

The construction is the same as for a gents collar. Note the different shape at the top of the revers.

19 Standard rever

Construct as for gents collar, but use existing neckline of block and join 7 to 1 in curve as shown.
Collar with lower stand Mark point 1 on roll line. Divide collar between centre back and point 1 into four sections, cut out, cut up lines, open 0.5 cm (extra for wider collars). Trace round pattern.

20 Standard rever with concealed stand

Construct standard rever pattern, with collar. Draw in concealed stand midway between shoulder balance point and roll line. Proceed as for shaped convertible collar (ref. 8 page 72).

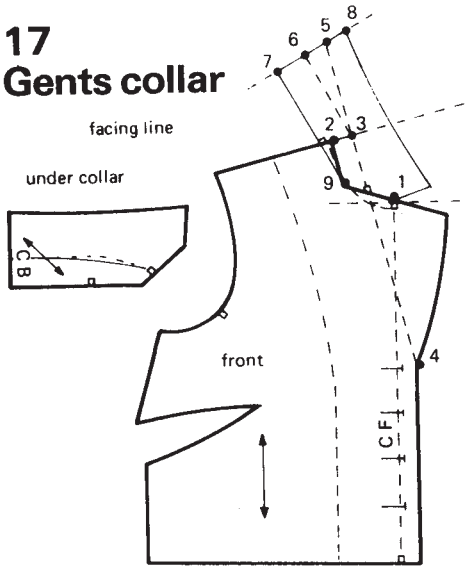
21 Collar and rever with complete stand

Construct a standard rever pattern with collar, but measurement 2–3 = 3 cm (or depth of stand required).
Collar must meet rever at break line point 1.
Collar and stand Trace collar, join 6 to 1 with straight line, shape neck edge to point 9, 2.5 cm down from 1.
Proceed as for shaped shirt collar (ref. 9 page 72).

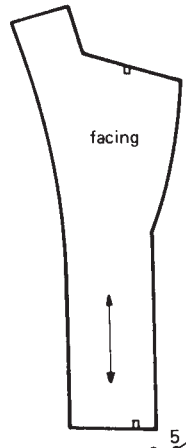
22 Collar set away from neck

Trace round front bodice, lower neckline required amount on front and back pattern. Construct standard rever on new neckline, with new back neck measurement.

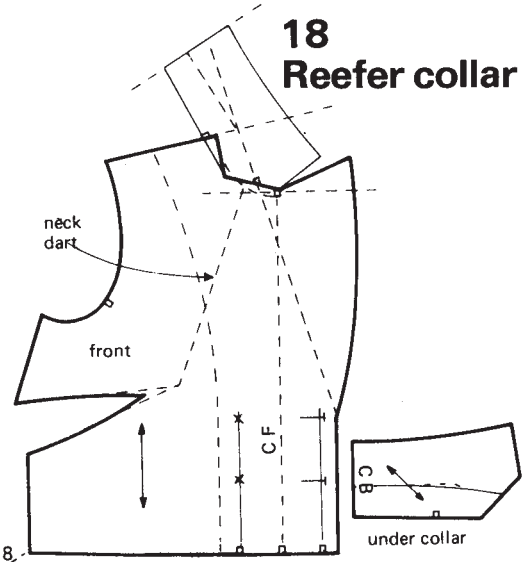
17 Gents collar



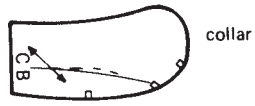
Facings



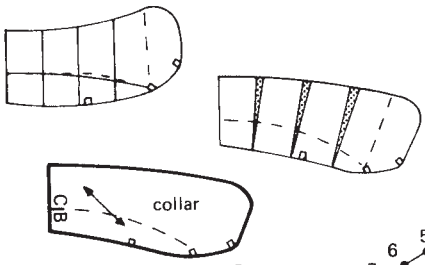
18 Reefer collar



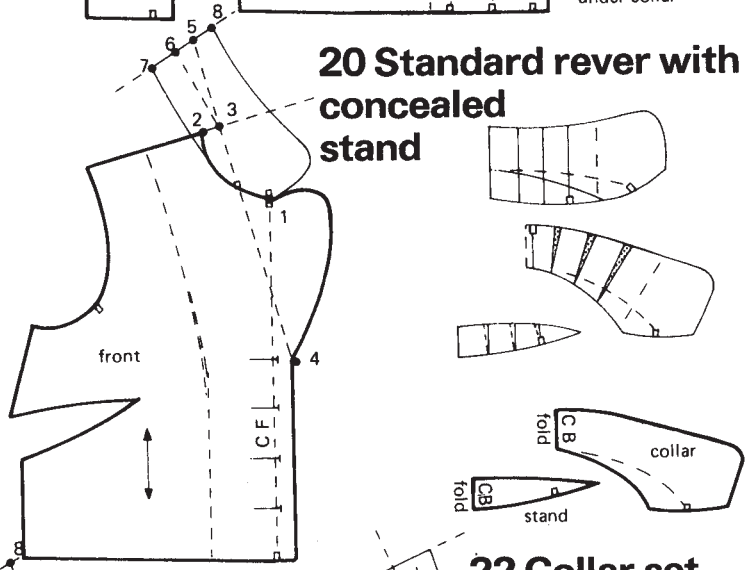
19 Standard Rever



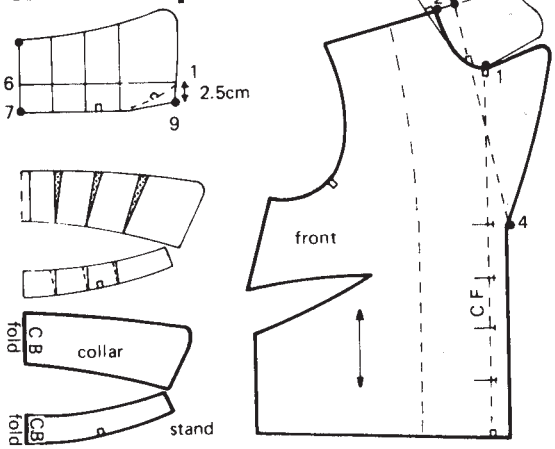
Collar with lower stand



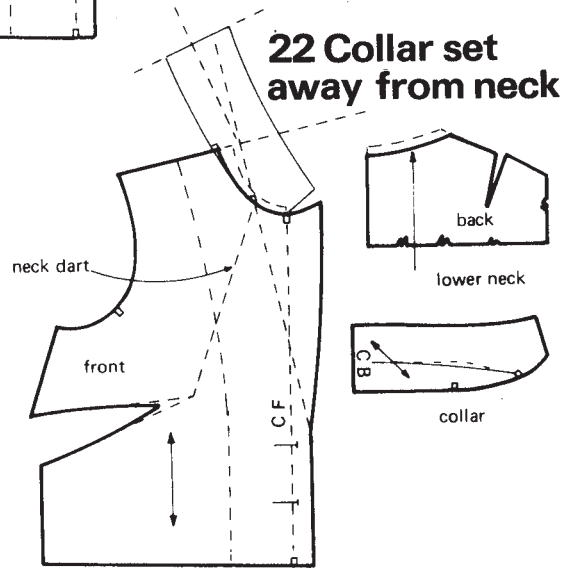
20 Standard rever with concealed stand

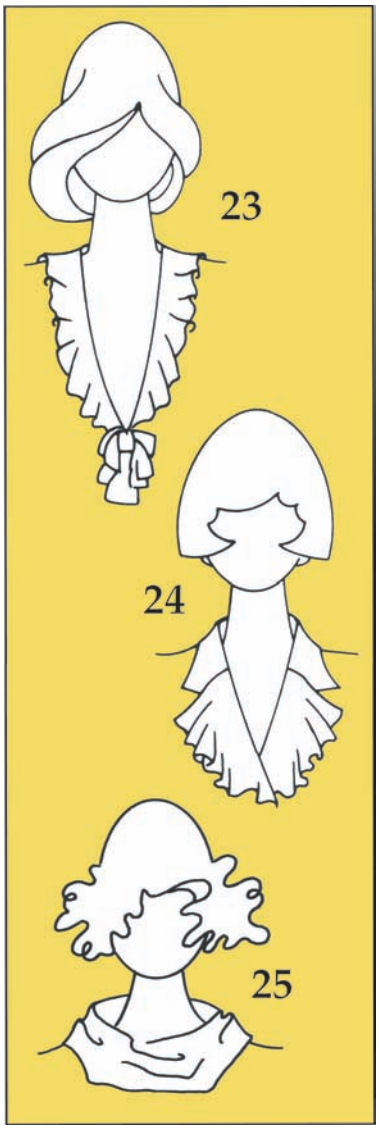


21 Collar and rever with complete stand



22 Collar set away from neck





23 Frilled collar

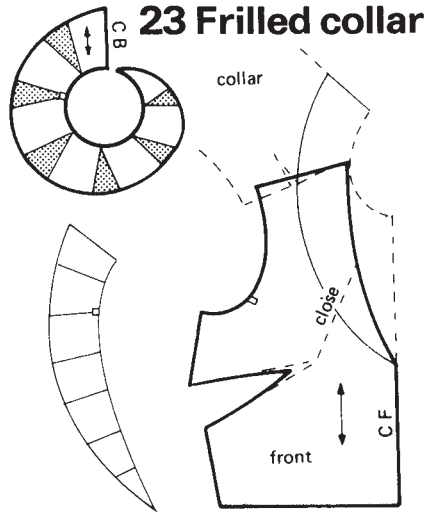
Construct a flat collar of required shape (ref. 1 page 70). Divide into seven sections. Cut out. Cut up lines and open till neck makes almost a full circle. Trace round collar making a smooth line. This makes only half a collar so collar requires a back seam.

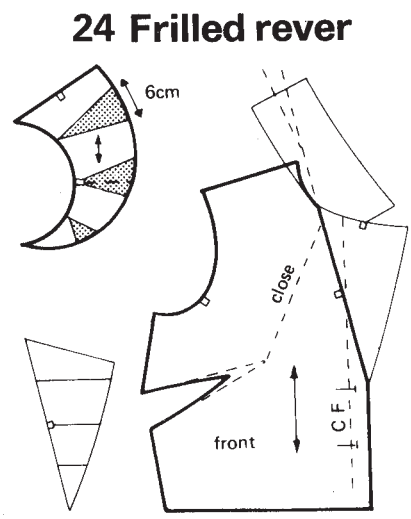
24 Frilled rever

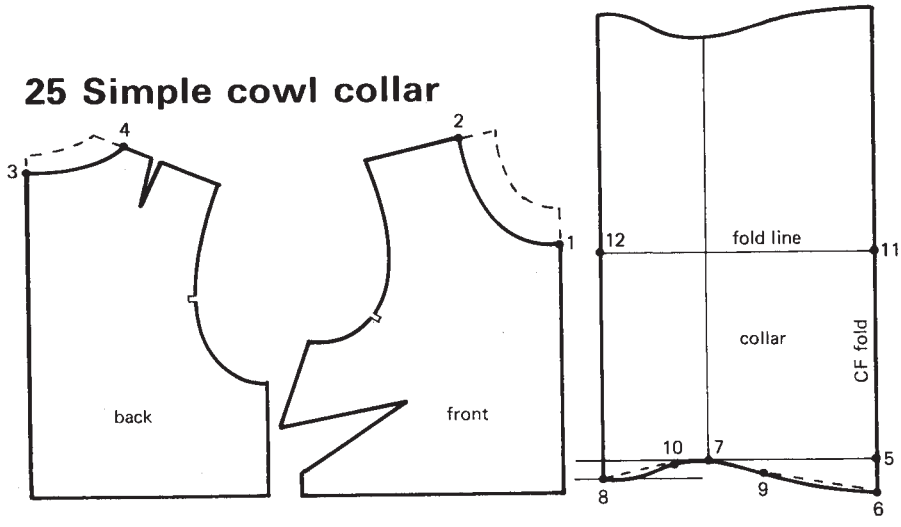
Trace round bodice block, construct a collar and rever based on the method of making a gents collar (ref. 17 page 76). Cut off rever, divide into sections, cut up lines and open out 6 cm as shown. Trace round pattern.

25 Simple cowl collar

Lower neckline approx. 3 cm at the shoulders, 1.5 cm at centre back, 3.5 cm at centre front.
Mark new neckline points 1, 2, 3, 4.
Square up and across from 5. 5–6 = 3 cm.
6–7 = the measurement 1–2 (measured in a curve) minus 1 cm; square up. Draw a parallel line 2 cm below line from 5.
7–8 = the measurement 3–4 (measured in a curve) minus 0.6 cm; square up.
7–9 one third the measurement 6–7.
7–10 one third the measurement 7–8.
Curve the neckline 0.5 cm on each section as shown.
5–11 is the depth of collar (example is 17 cm); square across to 12.
Fold along the line 11–12, cut out pattern with paper folded to repeat the shape.







PART ONE: CLASSIC FORM CUTTING

6 The basic fitted skirt block and adaptations

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Note The adaptations in this chapter are based on skirts that sit on the waistline and require a close tailored fit around the waist and hips. However, many fashions today have lowered or elasticated waistlines or yokes. Many skirts are now cut in fabrics with stretch, or are cut on the cross; therefore a simpler approach to the above adaptations can be made – see the simple and very simple skirt blocks in Part 2, Chapter 9 (page 134).

The tailored skirt block

The tailored skirt block is used when the skirt is *not* required to be attached to a bodice. Less ease has been added to the hips of the skirt and this gives a closer fit. The side seam is moved forward.
Note There is 1 cm ease in the waistline of the skirt. The waistline of a skirt should always be eased onto the skirt waistband or petersham.

Measurements required to draft the block

Measurement from any of the size charts in this book (pages 12–14) or personal measurements (see page 178) can be applied to the block.
A size 12 from the size chart on page 12 (for fashion garments) is used for this illustrated example.

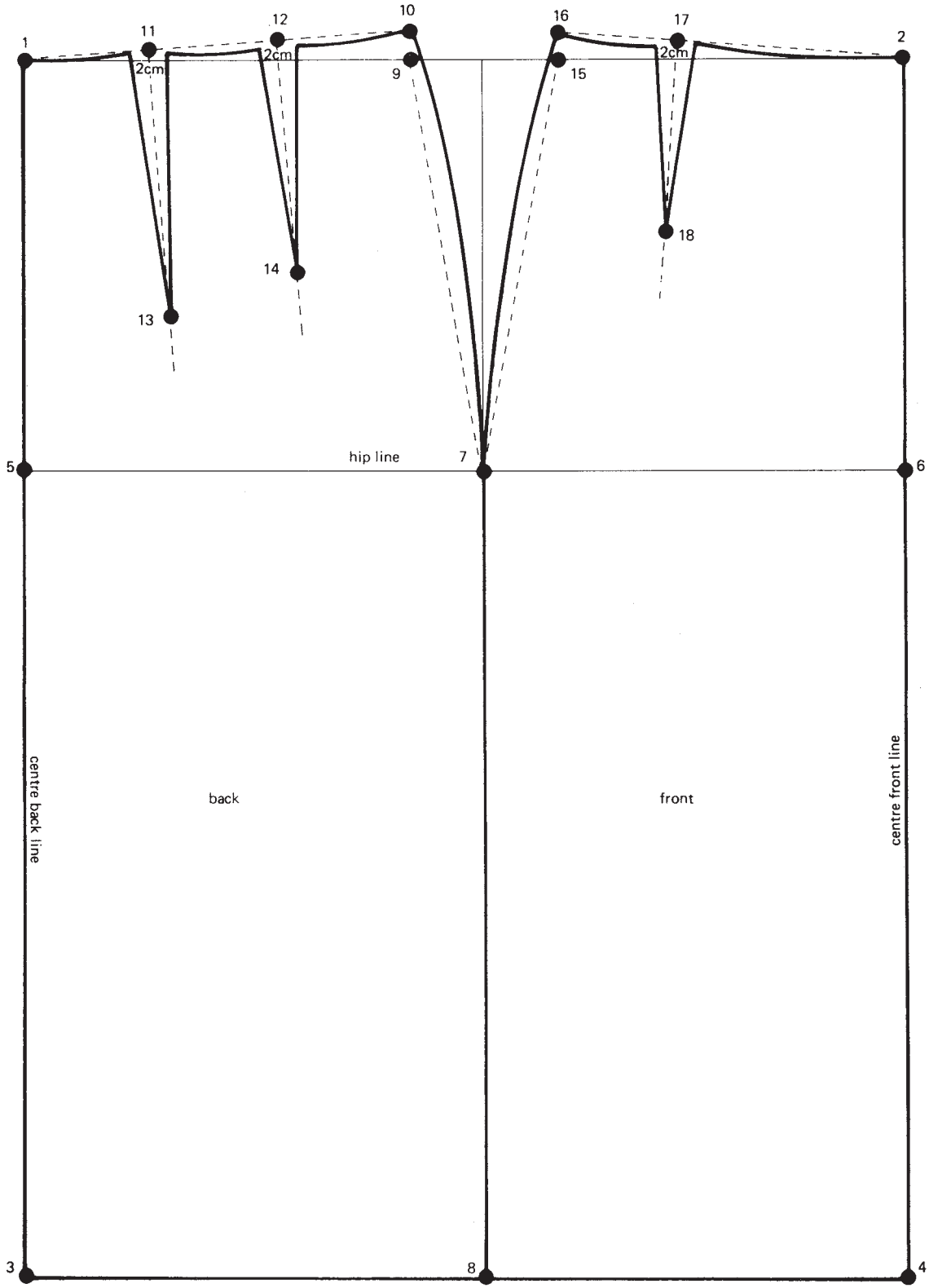
waist	68 cm
hips	94 cm
waist to hip	20.6 cm
skirt length (affected by fashion)	

Square down and across from 1.
1–2 half the hip measurement plus 1.5 cm, square down; this line is the centre front line.
1–3 skirt length, square across to 4 on the centre front line.
1–5 waist to hip measurement, square across to 6 on the centre front line.

Back
5–7 quarter the hip measurement plus 1.5 cm ease, square down to 8 on the hemline.
1–9 quarter waist measurement plus 4.25 cm.
9–10 1.25 cm; join 10 to points 1 and 7 with dotted lines.
Divide the line 1–10 into three parts, mark points 11 and 12.
Using the line 1–10, square down from points 11 and 12 with dotted lines.
11–13 14 cm.
12–14 12.5 cm.
Construct two darts on these lines, each 2 cm wide.
Draw in the waistline with a slight curve; draw in the side seam curving it outwards 0.5 cm.

Front
2–15 quarter the waist measurement plus 2.25 cm.
15–16 1.25 cm, join 16 to points 2 and 7 with dotted lines.
16–17 is one third the distance 2–16; using the line 2–16, square down from 17 with a dotted line.
17–18 10 cm.
Construct a dart on this line 2 cm wide.
Draw in the waistline with a slight curve, draw in the side seam curving outwards 0.5 cm.

Special note for individual figures
If the waist is small in proportion to the hip size of the standard block, increase the width of the darts to 2.5 cm. This will require you to draft:
1–9 quarter waist plus 5.25 cm.
2–15 quarter waist plus 2.75 cm.
This ensures a more even suppression around the waistline.


1
11
12
10
16
17
2
2cm
2cm
2cm
9
15
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13
hip line
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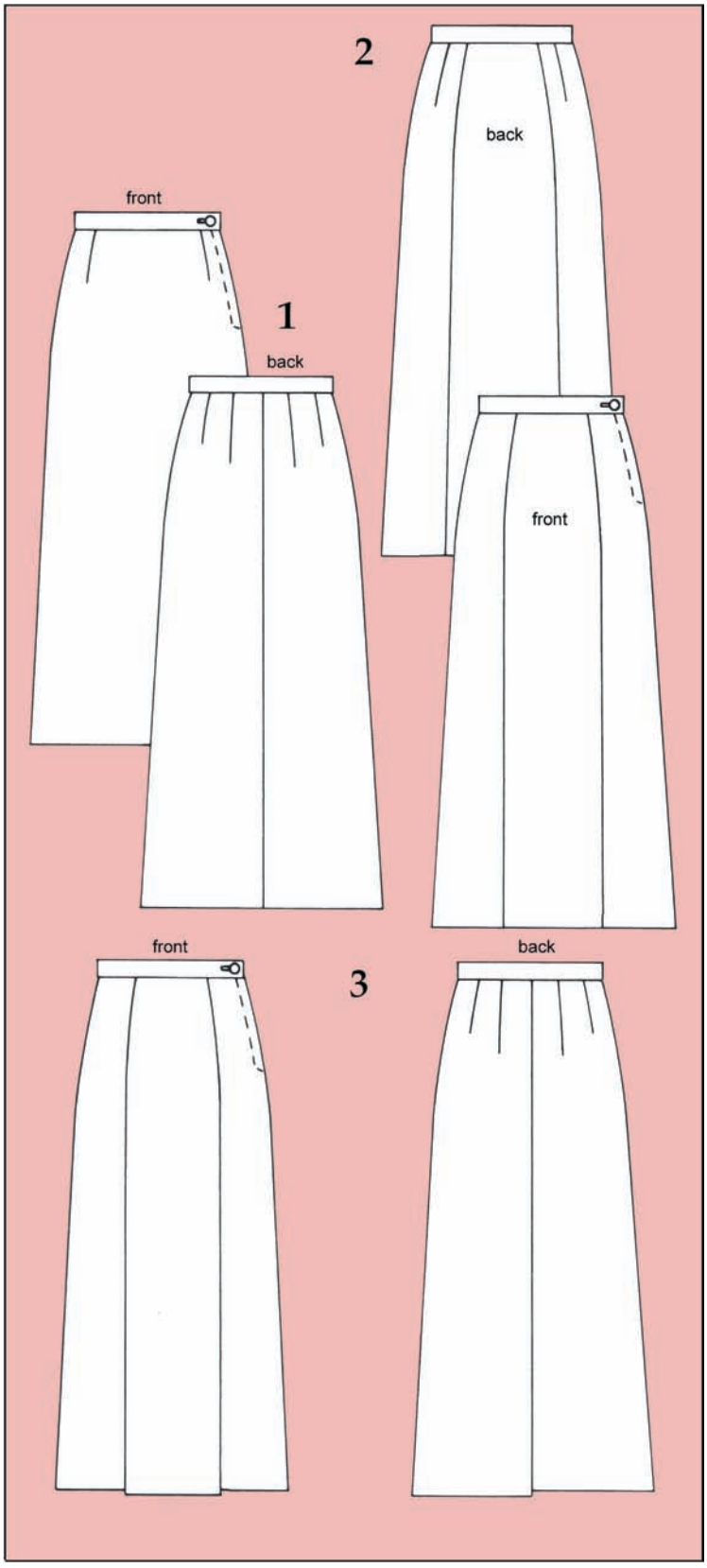
5
6
centre back line
back
front
centre front line
3
8
4



Skirt patterns – examples

Choose the correct skirt block. If the skirt is a separate garment use the tailored skirt block. If the skirt is to be attached to a bodice, use the skirt of the two-piece dress block.
Waist darts All waist darts can have their positions moved, but the darting must be evenly distributed.

1 Straight skirt

Trace round skirt block.
Mark points 1 and 2 on centre back line. 2–3 = 1 cm. Join 1 to 3. This becomes new centre back line; it gives a slight swing to the back skirt to prevent seating. *Use this swing on straight skirts only.*
Add 2.5 cm flare to side seams at hem.
Mark point 4. Join 4 to hip point.
Note A completely straight skirt can be cut without swing or flare.

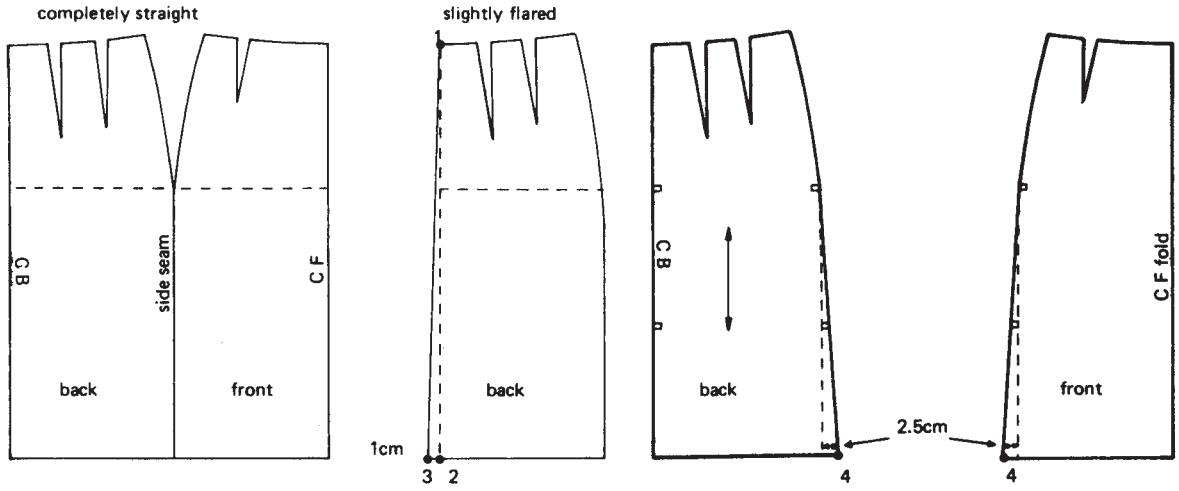
2 Panel skirt

Trace the straight skirt pattern.
Draw panel lines on front and back.
Transfer front and one back dart onto these lines. Cut up panel lines and along dart shaping to separate the pieces. Trace round new pattern sections.

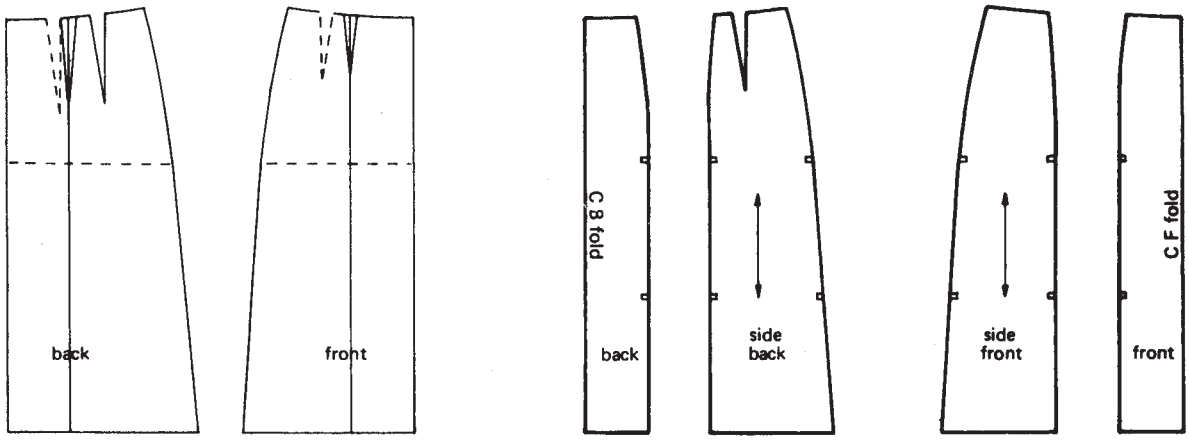
3 Straight skirt with vent pleat – box pleat

Trace the straight skirt pattern.
Back Mark centre back line.
Pleat stitch line Add a pleat to this line 8 cm wide.
Fold pattern on pleat stitch line and cut out.
Front Mark pleat line, transfer dart to this line. Separate panels.
On a new piece of paper draw three parallel lines 8 cm between. Place panels to the outer lines as in the diagram; trace round panels.
Fold pattern along pleat lines so that pleat folds towards centre front.
Cut out pattern.

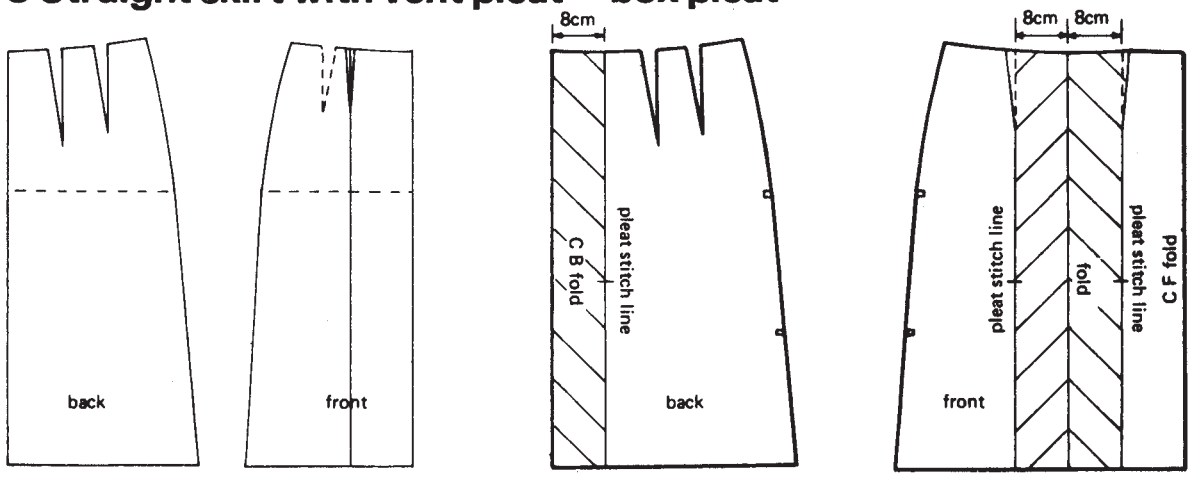
1 Straight skirt

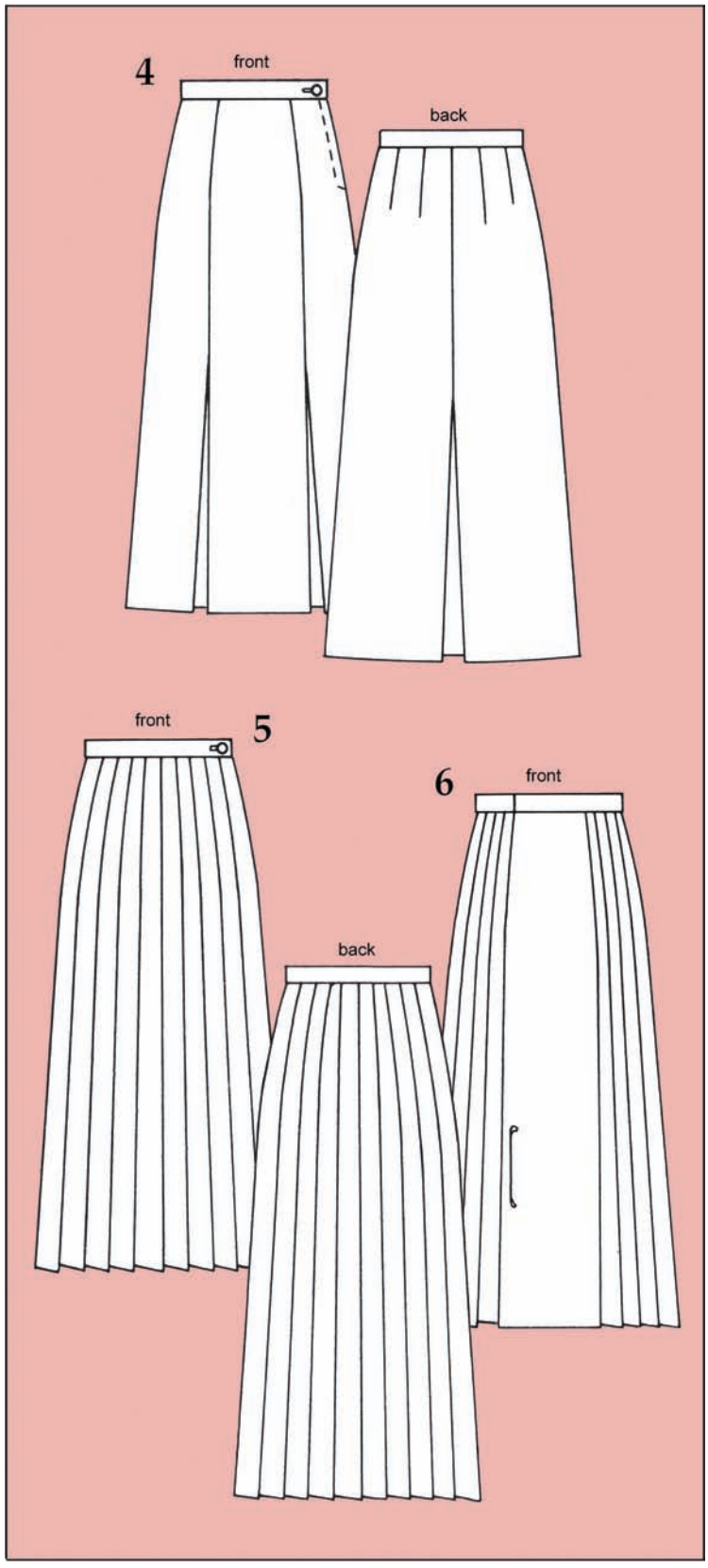


2 Panel skirt



3 Straight skirt with vent pleat — box pleat





4 Straight skirt – inverted pleats

Trace straight skirt pattern.
Back On a new piece of paper draw three parallel lines 8 cm between. Place back skirt pattern to inner line and trace around.
Fold pattern along the pleat line so that pleat falls towards side seam.
Cut out pattern.
Front Mark pleat line, transfer dart to this line, separate panels.
On a new piece of paper draw five parallel lines 8 cm between. Place panels to outer lines as in diagram; trace round panels.
Fold the pattern so that pleat 1 folds towards side seam, and pleat 2 folds towards centre front.
Cut out pattern.
Note If a tight lay is required the centre panels of the pleat can be cut as a separate panel *or* the pleat can be finished at the line 1–2.

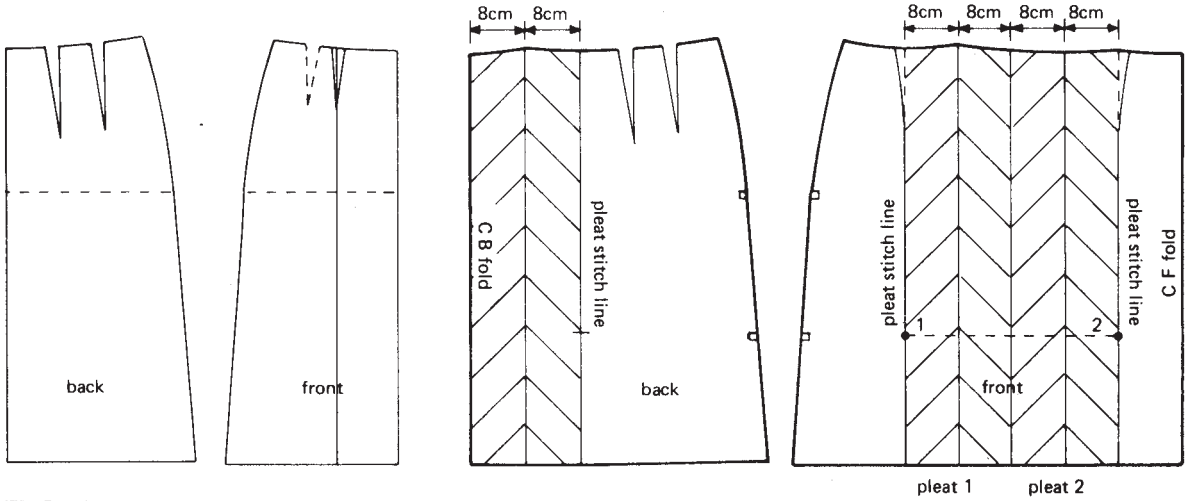
5 Skirt with all-round pleats (work directly onto cloth)

Decide pleat width; work out the number of pleats required to make up the hip measurement plus approx. 2 cm ease.
Work directly onto the cloth. Cut a piece of fabric; depth = skirt length plus hem and seam allowance; width = three times (hips + ease) plus seam allowance. The fabric will have to be seamed to obtain this width.
Mark pleats with pins as shown in diagram.
Fold pleats and tack to hip line.
To shape waist take the edge of each pleat and lap it over the required amount to obtain correct waist measurement.

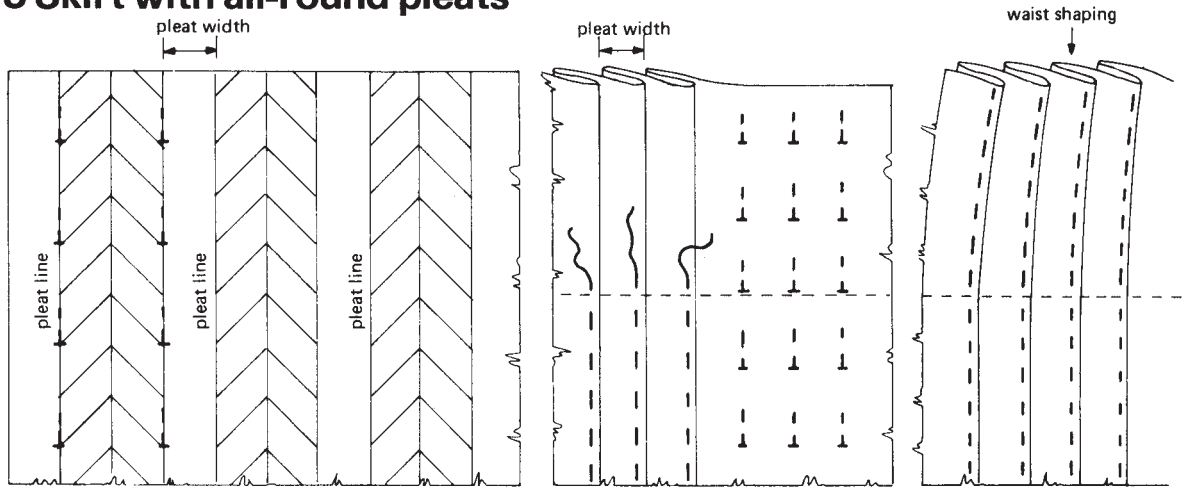
6 Kilt (work directly onto cloth)

The pleats are made as above.
Eight pleats less are required for a kilt.
Allow 10 cm each side of centre front for top wrap; allow same amount for underwrap.

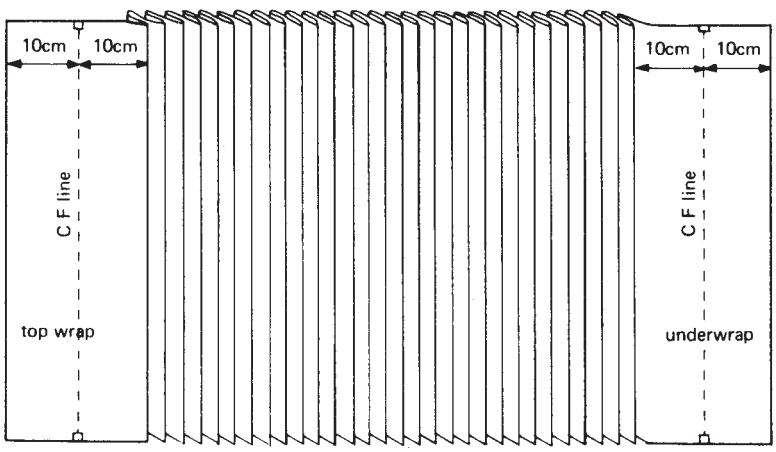
4 Straight skirt — inverted pleats



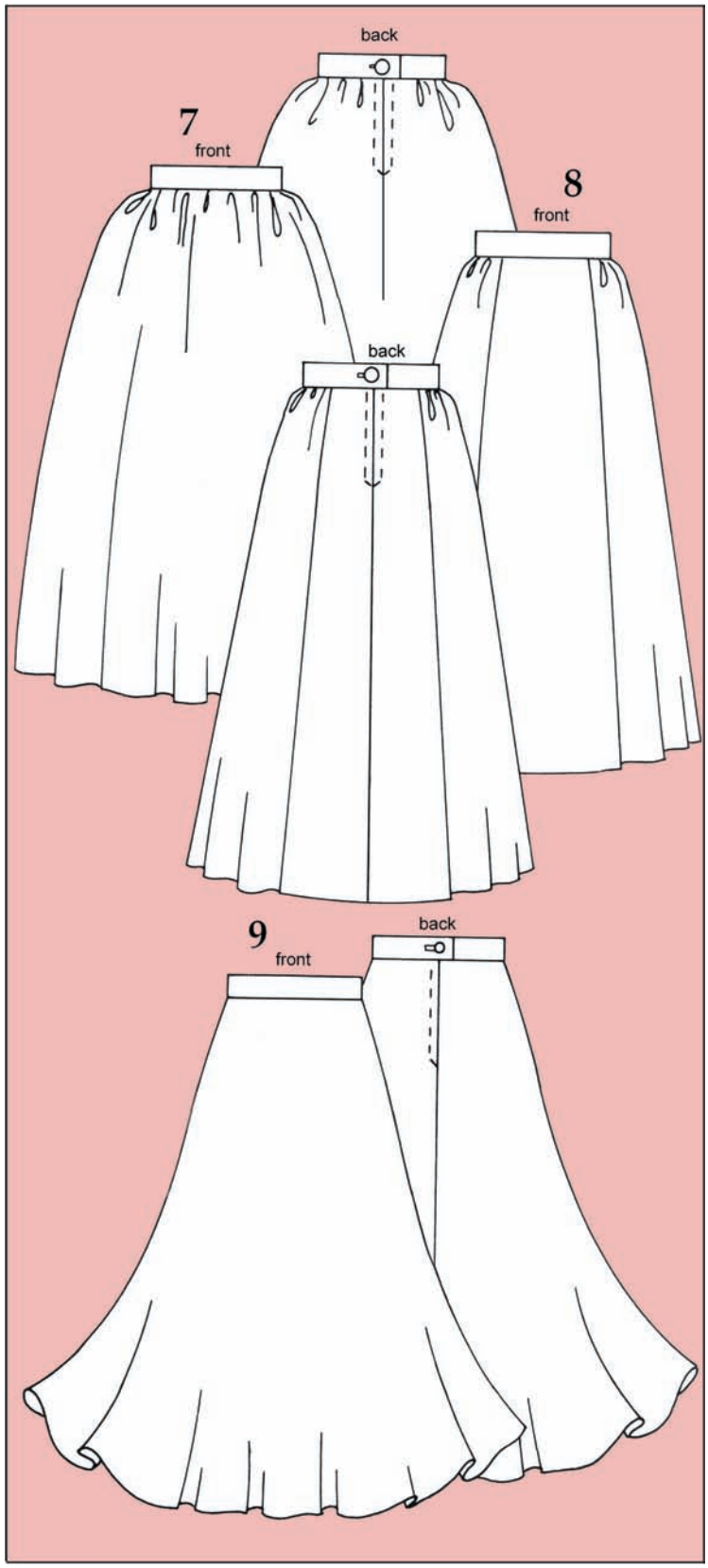
5 Skirt with all-round pleats



6 Kilt



kilt before the waist is shaped



7 *Gathered skirt*

Slightly gathered Cut two rectangles; depth = skirt length, width = one quarter hips + 15 cm. Curve the waistline 1.5 cm higher at the side seam.

Very gathered Cut directly in cloth. Cut a piece of fabric; depth = skirt length plus hem and seam allowance, width = approx. three times hip size. The fabric will have to be seamed to obtain the width. (Place waistline to selvedge on suitable fabrics only.) Fold fabric. Place centre front to fold. Mark side seams at half the distance.

8 *Gathered skirt with panels*

Trace round basic block.
Draw in panel lines. Transfer front dart and one back dart to these lines, rub out the other back dart.
Divide back and front side panels in half with a dotted line; mark B1 and B2, F1 and F2. Cut out.

Centre front/centre back panels
Trace round panels, add approx. 5 cm flare at hem of panel seam.

Side panels Trace round panel 1, add approx. 5 cm flare at hem of panel seam.
Draw a line parallel to the dotted line, width 12 cm. Place panel 2 to this line and trace round.
Add approx. 5 cm flare at hem of the side seam.

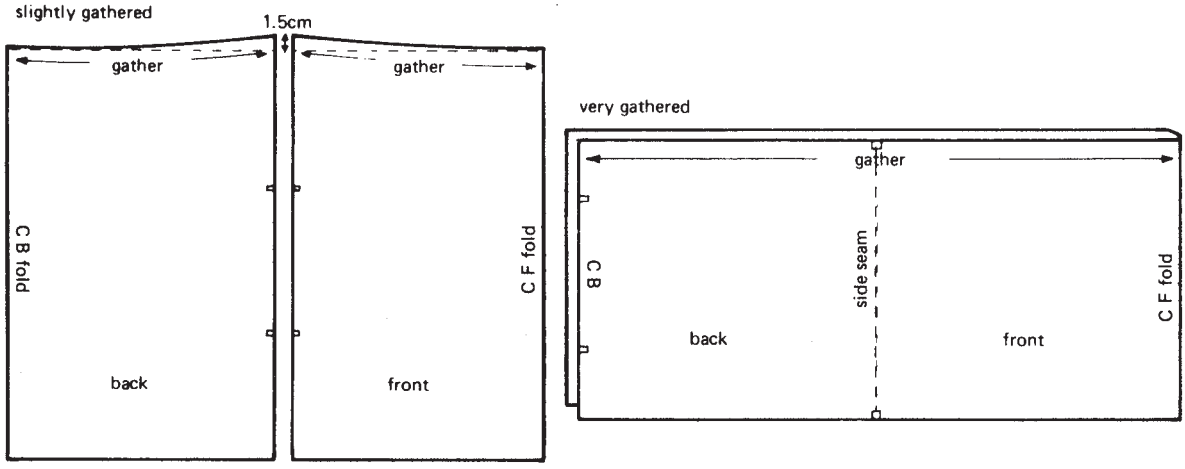
Note When adding flare take flare line to hipline.

9 *Circular skirt*

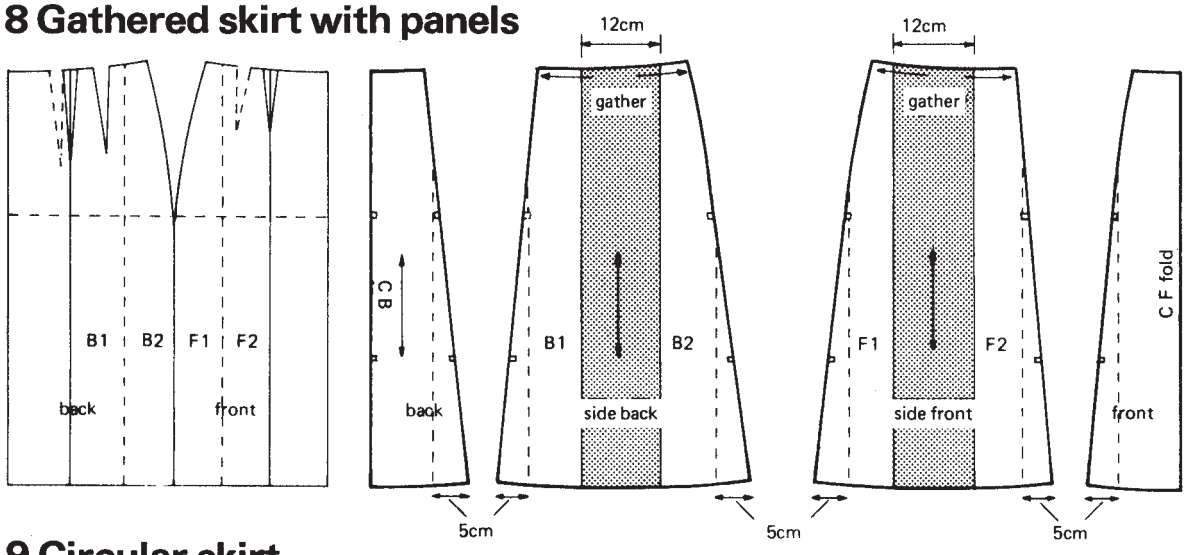
The construction of a circular skirt is based on the circle. Make the waist measurement the circumference. Calculate the radius (see Appendix, page 212).
Square both ways from 1.
1–2 = the radius. 1–3 = the radius.
Draw a quarter circle from 2–3.
2–4 = skirt length.
With a metre stick mark out the edge of circle as shown.

Half circular skirt Construct the pattern as for the circular skirt but make the following alteration:
1–2 = twice the radius.
1–3 = twice the radius.

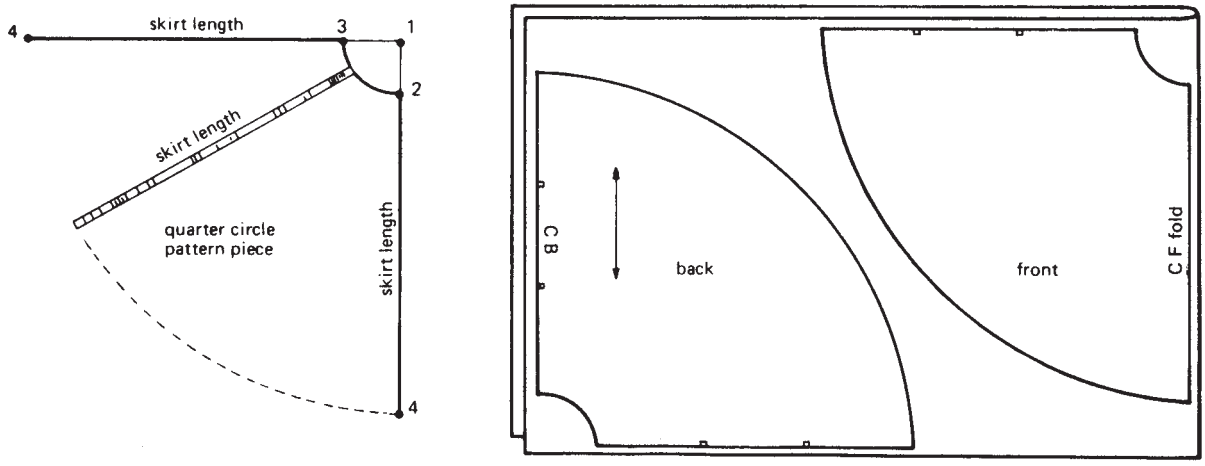
7 Gathered skirt

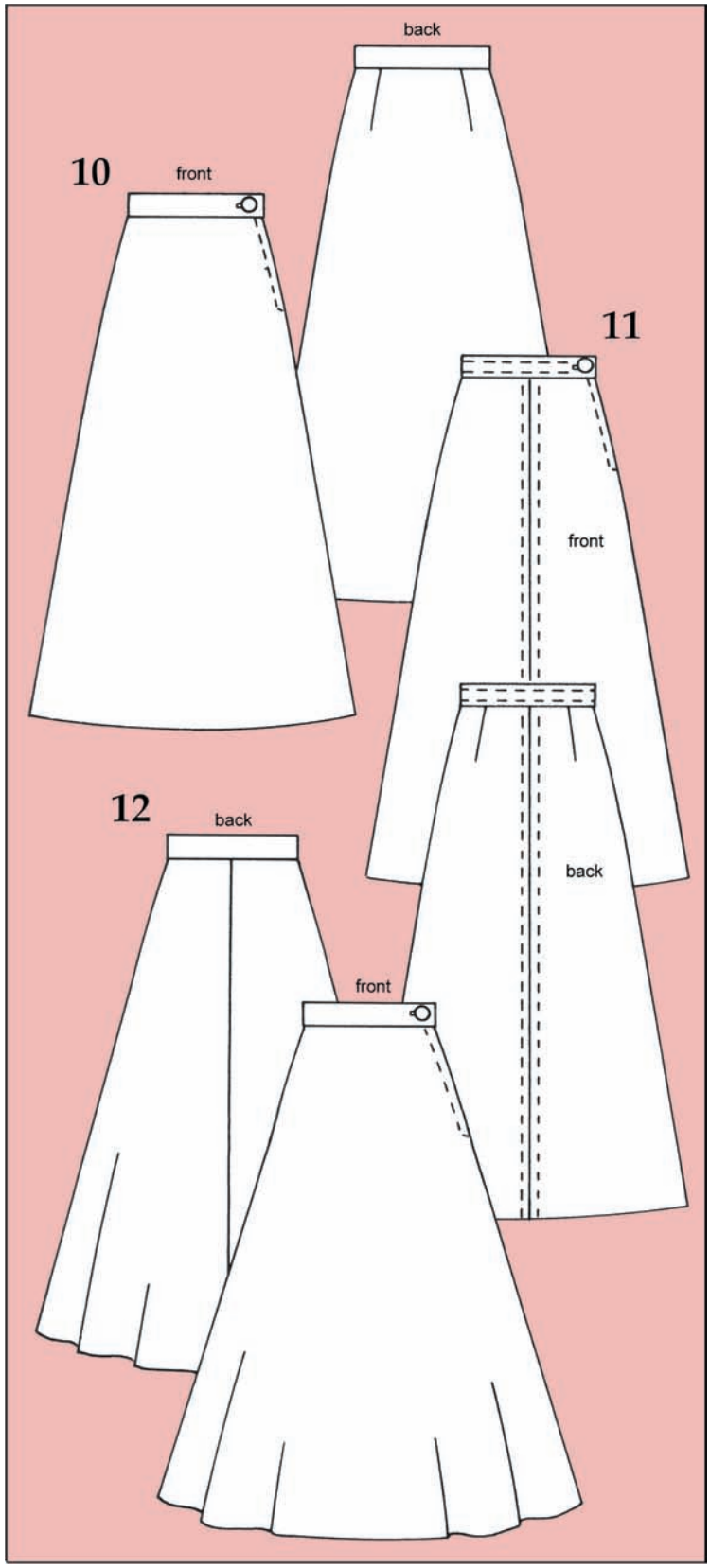


8 Gathered skirt with panels



9 Circular skirt





10 Basic 'A' line skirt

Trace round basic block.
Front Change the 2 cm front dart into two 1 cm darts placed at points where waistline is divided into three.
From the base of the darts draw vertical lines to hem.
Cut out pattern and cut up vertical lines. Close up darts.
Place on a new piece of paper, trace round new outline. Make sure the flare openings at hem are equal. Add 2.5 cm flare to hem at side seam.
Back Reduce the two waist darts to 1 cm and draw in a new 2 cm dart midway between.
From original darts drop vertical lines to hem. Close the two outer 1 cm darts, then proceed as for the front pattern.
The flare openings at the hem can be made equal to the front pattern if required.
Add 2.5 cm flare to hem at side seam.

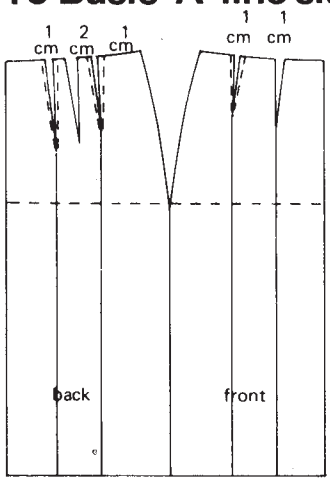
11 Four gored skirt

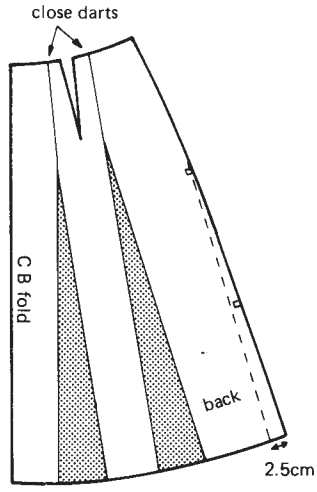
A four gored 'A' line skirt with the grain in the centre of the panel will have a better 'hang'.
Back Mark in hipline; mark points 1 and 2, 3 is midway between 1 and 2.
Mark in original side seam of basic block; mark points 4 and 5 on hemline, 6 is midway between 4 and 5.
Join 3 to 6. This line is the grain line.
Front Proceed as for back.
Note This skirt can be cut on the straight or cross.

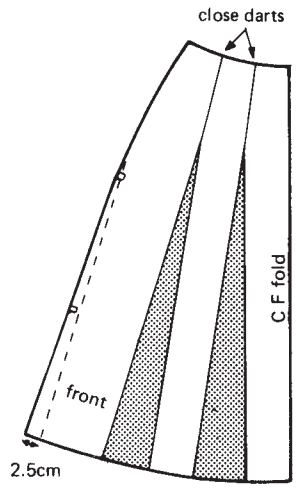
12 Skirt with extra flare

Trace round basic block.
Drop vertical lines from all darts and a point midway between front dart and centre front.
Cut out block and cut up vertical lines.
Close darts to give flare at hemline, open vertical line on front pattern to give an equal amount of flare.
Trace round new outlines on a new piece of paper.
Add 2.5 cm flare to hem at side seams.

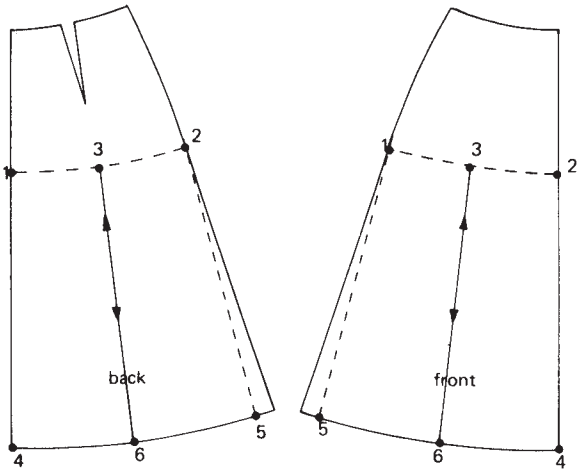
10 Basic 'A' line skirt

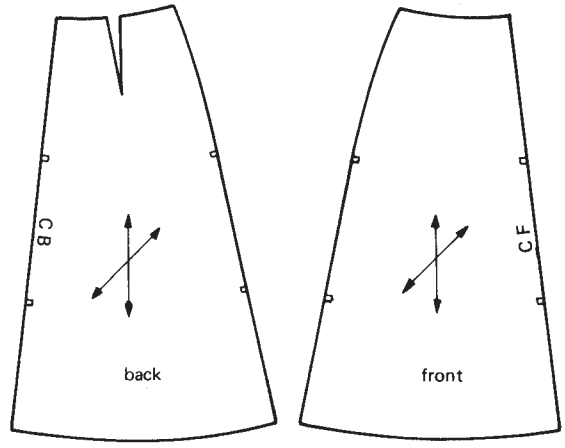




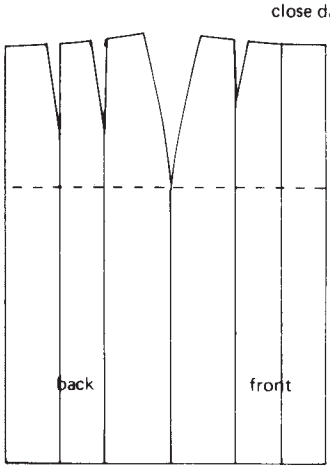


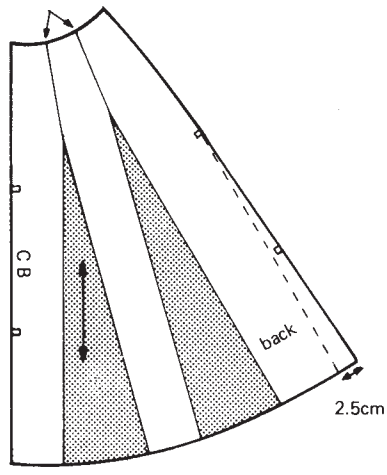
11 Four gored skirt

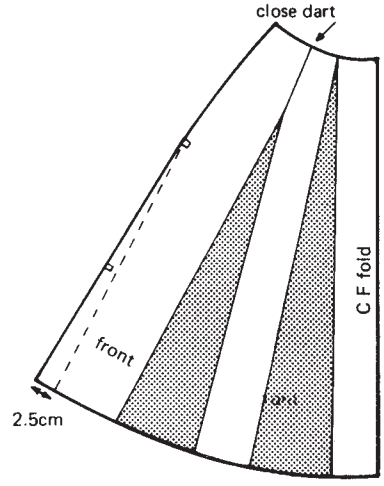


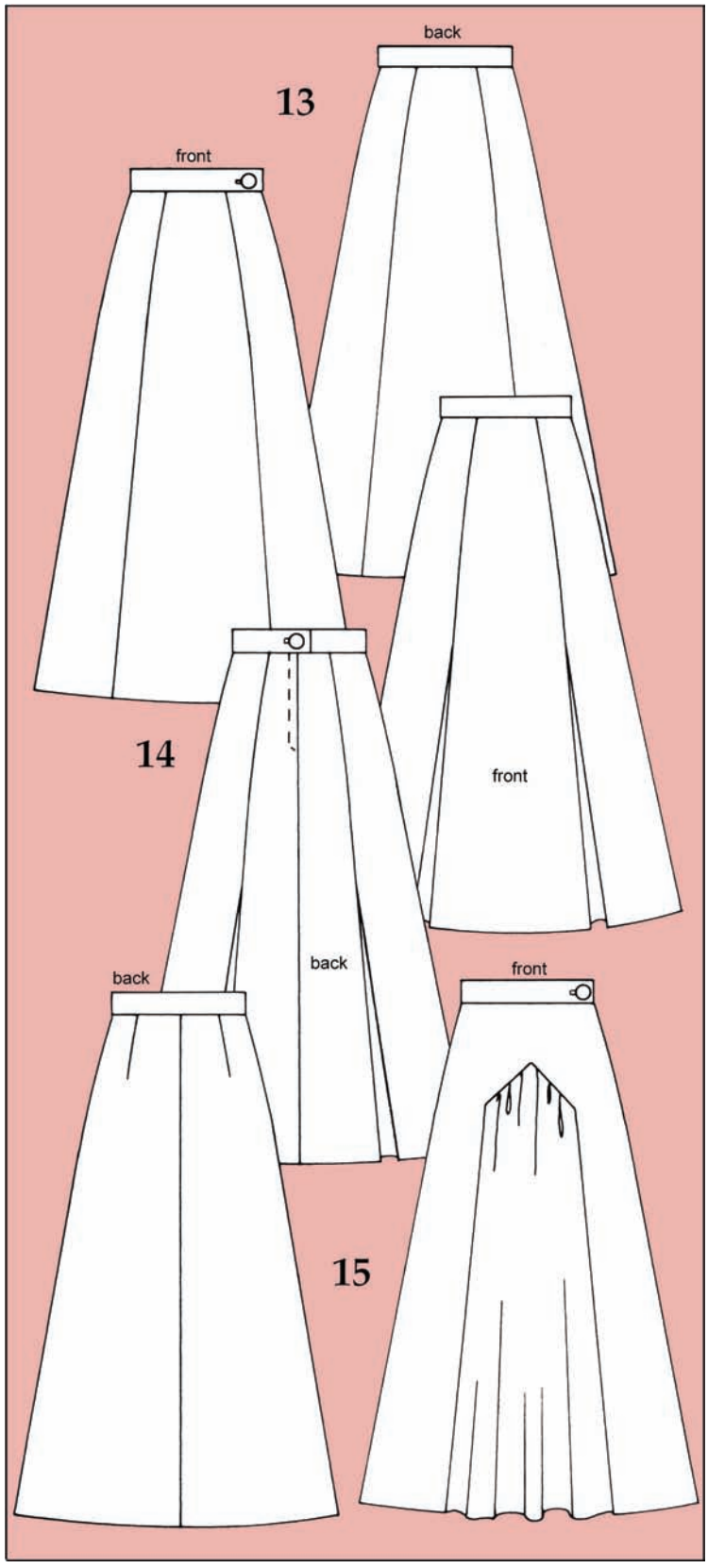


12 Skirt with extra flare









13 Gored 'A' line skirt

Trace round 'A' line skirt pattern.
Back Draw in hipline and original side seam. Mark points 1, 2, 3, 4, on hip and hemline.
1–5 is one third 1–2.
1–6 is one third 3–4.
Draw in panel line, transfer the back dart onto this line.
7 is midway 5–2. 8 is midway 6–4.
This is the grain line for side panel.
Cut up panel line and dart shaping.
Trace round new pattern pieces.
Front Proceed as for back; there is no dart in front pattern.
Note When skirt is not evenly divided by panel line, square down from hipline on side panel to find grain.

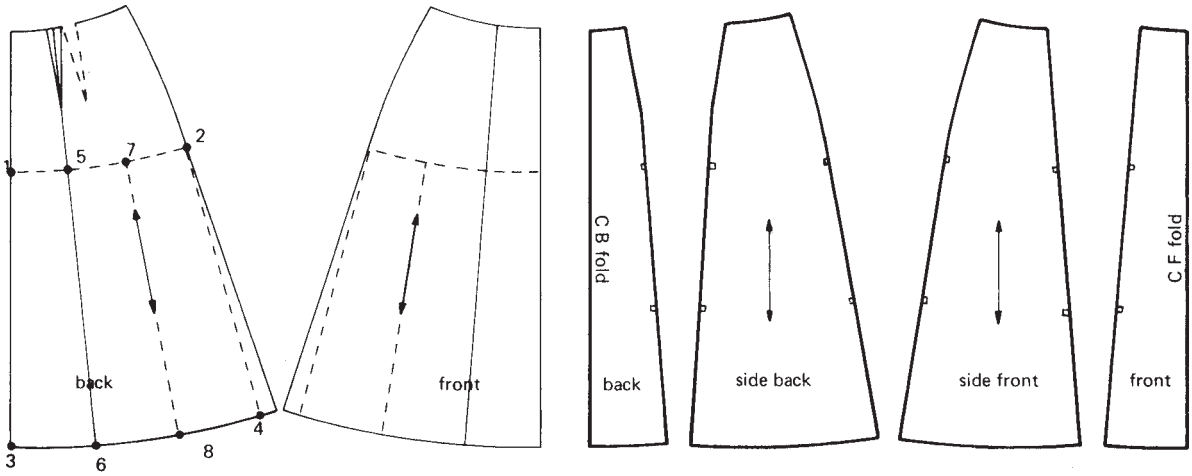
14 Gored and pleated 'A' line skirt

Trace round gored skirt pattern.
Back Extend pleat stitch line to waist by ruling a straight line (leave shaping at the waist marked). Mark points 1 at waistline and 2 at hemline.
1–3 = 6 cm. 2–4 = 9 cm. Join 3 to 4.
Fold along pleat line and cut out pattern.
Side back Extend pleat stitch line to waist and make pleat for side back as described above.
Pleat backing Draw a vertical line. Mark points 5 and 6.
5–6 = length of the pleat stitch line.
5–7 and 5–8 = 6 cm.
6–9 and 6–10 = 9 cm.
Join 7 to 9 and 8 to 10.
Cut out backing piece.
Front patterns Proceed as for back patterns; there is no waist shaping in the front.

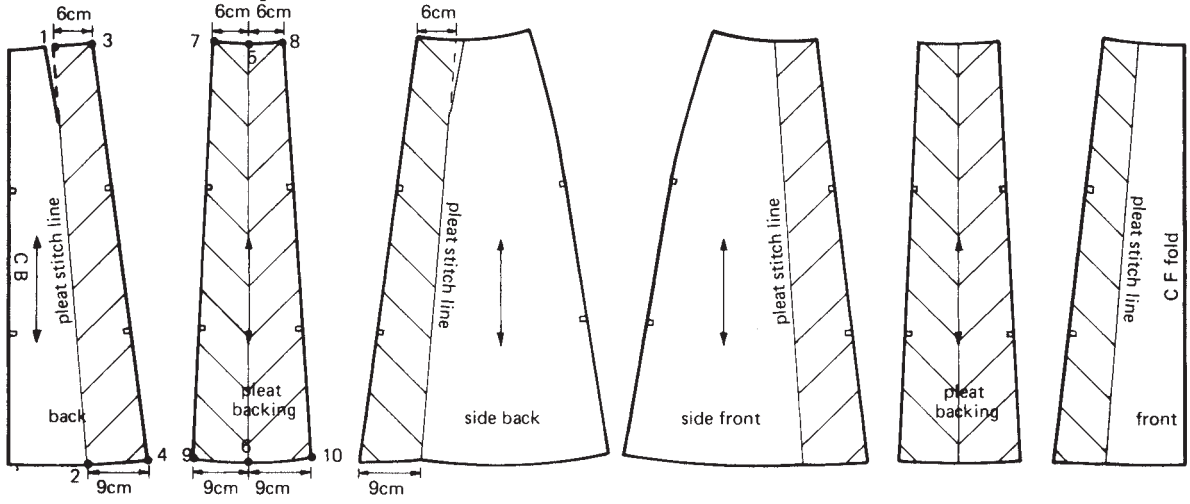
15 'A' line skirt – gathered inset

Trace round 'A' line skirt pattern.
Back Basic 'A' line pattern.
Front Draw in the design of inset on front pattern. Divide inset into three equal parts.
Cut out inset from front pattern. Cut up the vertical lines.
Place onto new paper; open out the sections, inserting 4 cm at top for gathers and 7 cm at bottom for flare. (More can be inserted if required.)
Trace round new outline of inset.

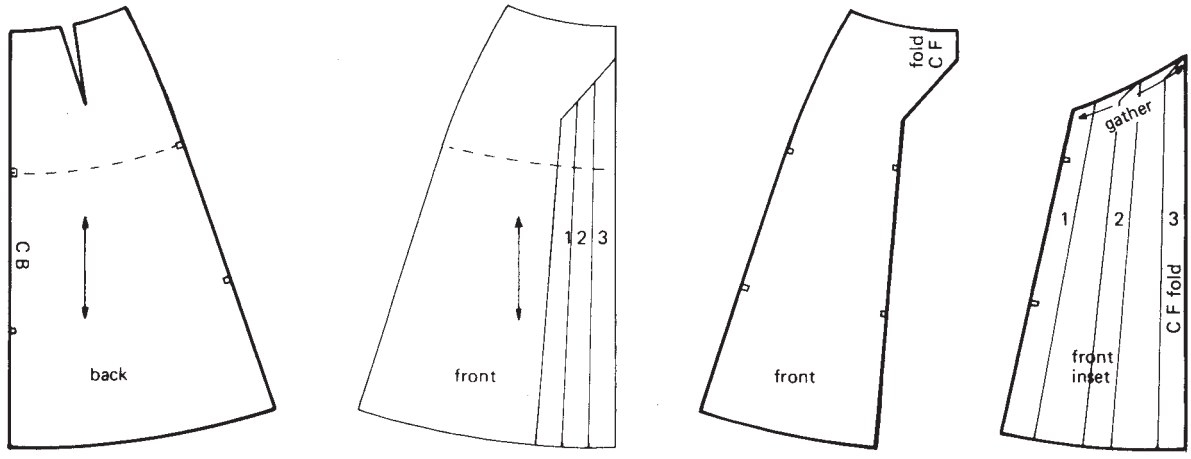
13 Gored 'A' line skirt

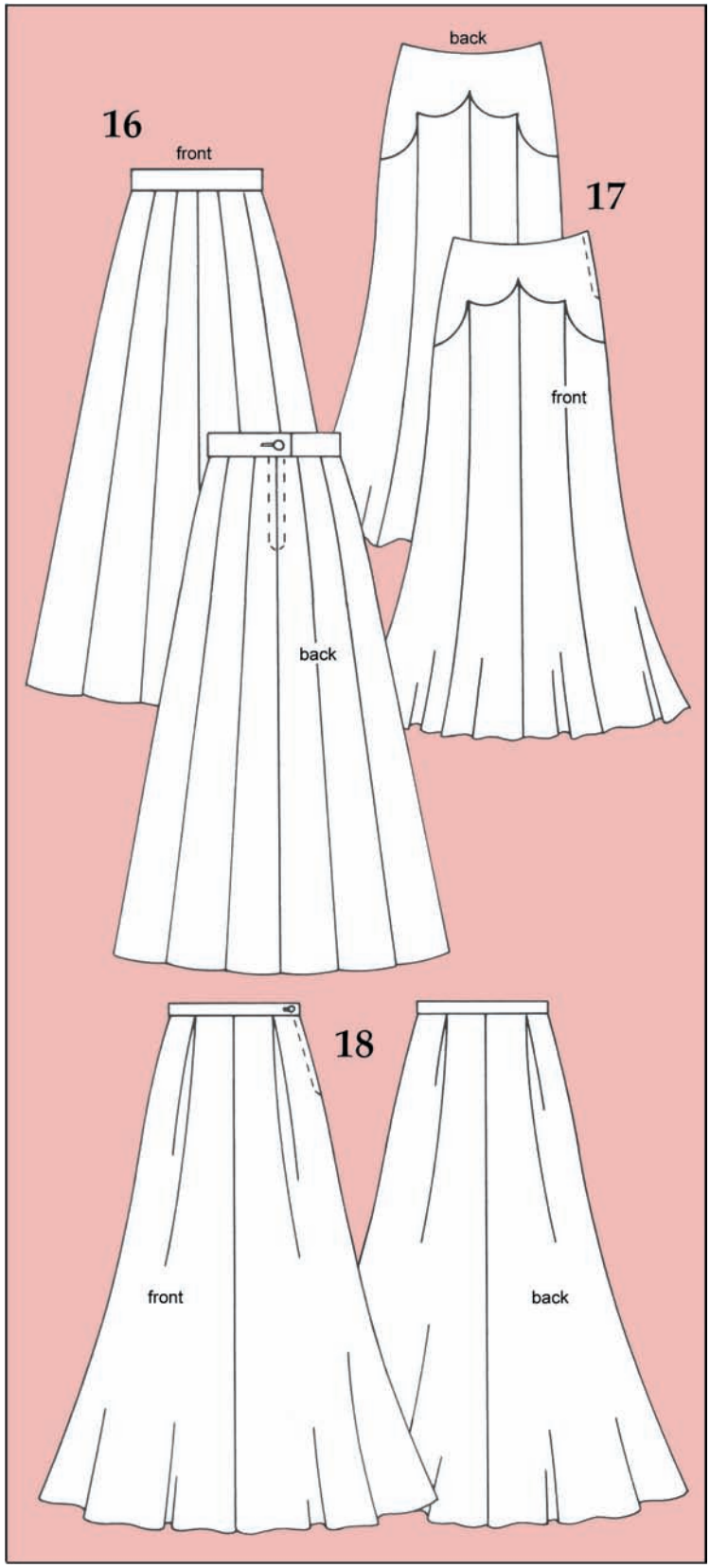


14 Gored and pleated 'A' line skirt



15 'A' line skirt — gathered inset





16 Gored skirt

(If using the tailored skirt block, transfer complete side seam to centre of block.) Rub out waist darts.
Divide front and back skirt into six equal sections on hipline. Square up and down.
New darting Darts to touch a dotted line 14 cm down from waistline.
Add 1 cm to waistline at front and back side seam. Make two 2.5 cm darts on back panel lines and two 1.5 cm darts on front panel lines.
Add 3 cm flare to hem of all panel seams.

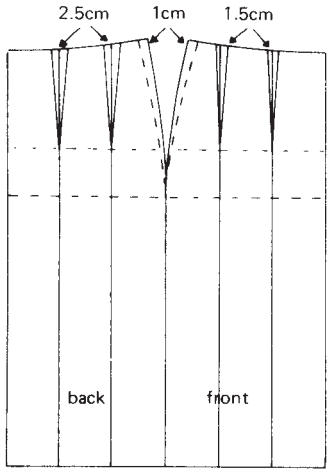
17 Gored skirt with low flare

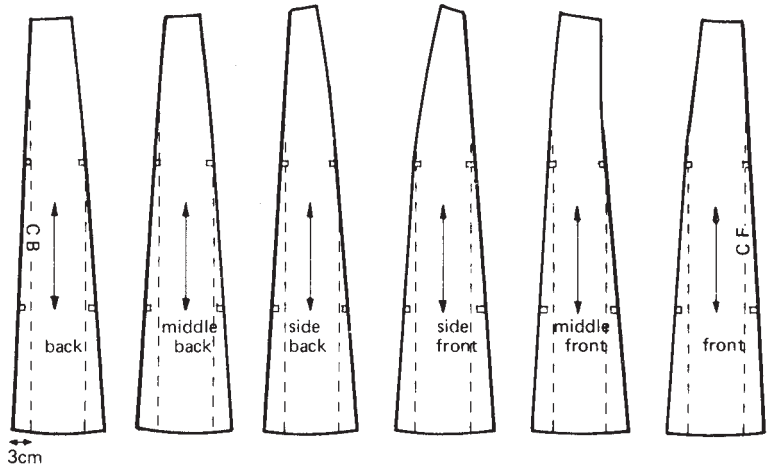
Trace round basic skirt block.
Draw in shaped yoke and drop vertical lines from the shaped points.
Mark balance points halfway down the length of the skirt. Extend waist darts to yoke line.
Yokes Cut yokes from pattern, close darts and trace round new outline on new piece of paper.
Gores Cut out skirt and cut up vertical lines. Trace round the four gores.
Add 7 cm flare at hem, join to low balance points.
Note Skirt can be cut on the cross.

18 Flared skirt – unpressed pleats

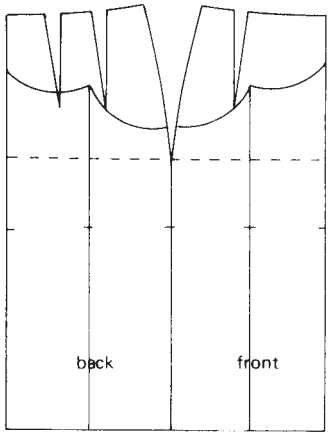
Trace round basic block.
Back Draw in pleat line, move inner dart onto this line. Cut out pattern and cut up pleat line.
On a new piece of paper draw vertical lines 1–2.
1–3 and 3–4 = 5 cm.
2–5 and 5–6 = 7 cm.
Join lines 3–5 and 4–6.
Place the pieces of back each side of lines 4–6 and trace round.
Add 5 cm flare to hemline at centre back and 7.5 cm to hemline at side seam.
Fold pattern on pleat lines, one pleat folded towards centre back, the other towards side seam. Cut out pattern.
Front Draw in pleat line. Transfer front dart to this line, proceed as for the back.
Note Skirt can be cut on the cross.

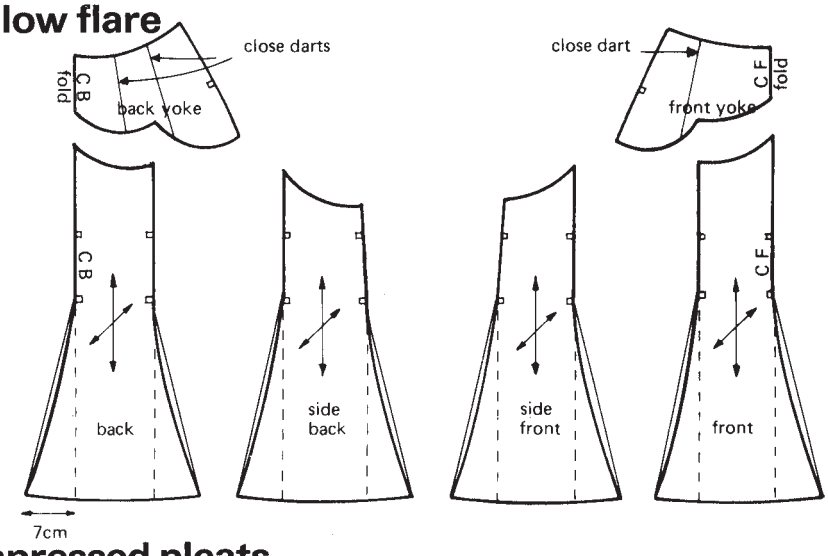
16 Gored skirt



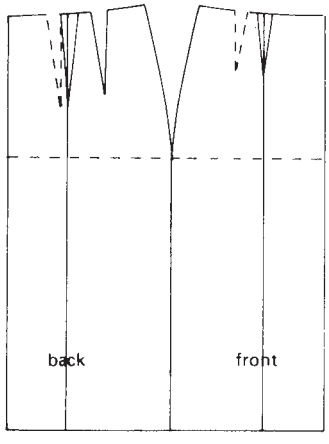


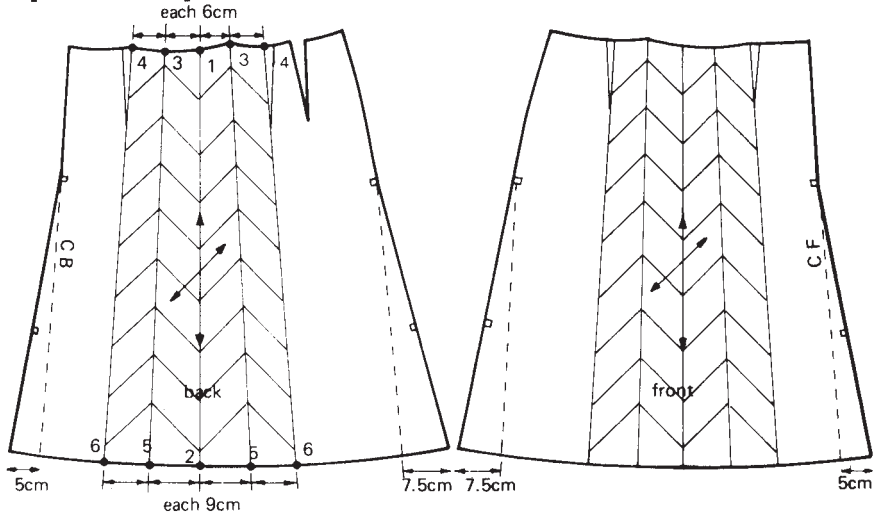
17 Gored skirt with low flare

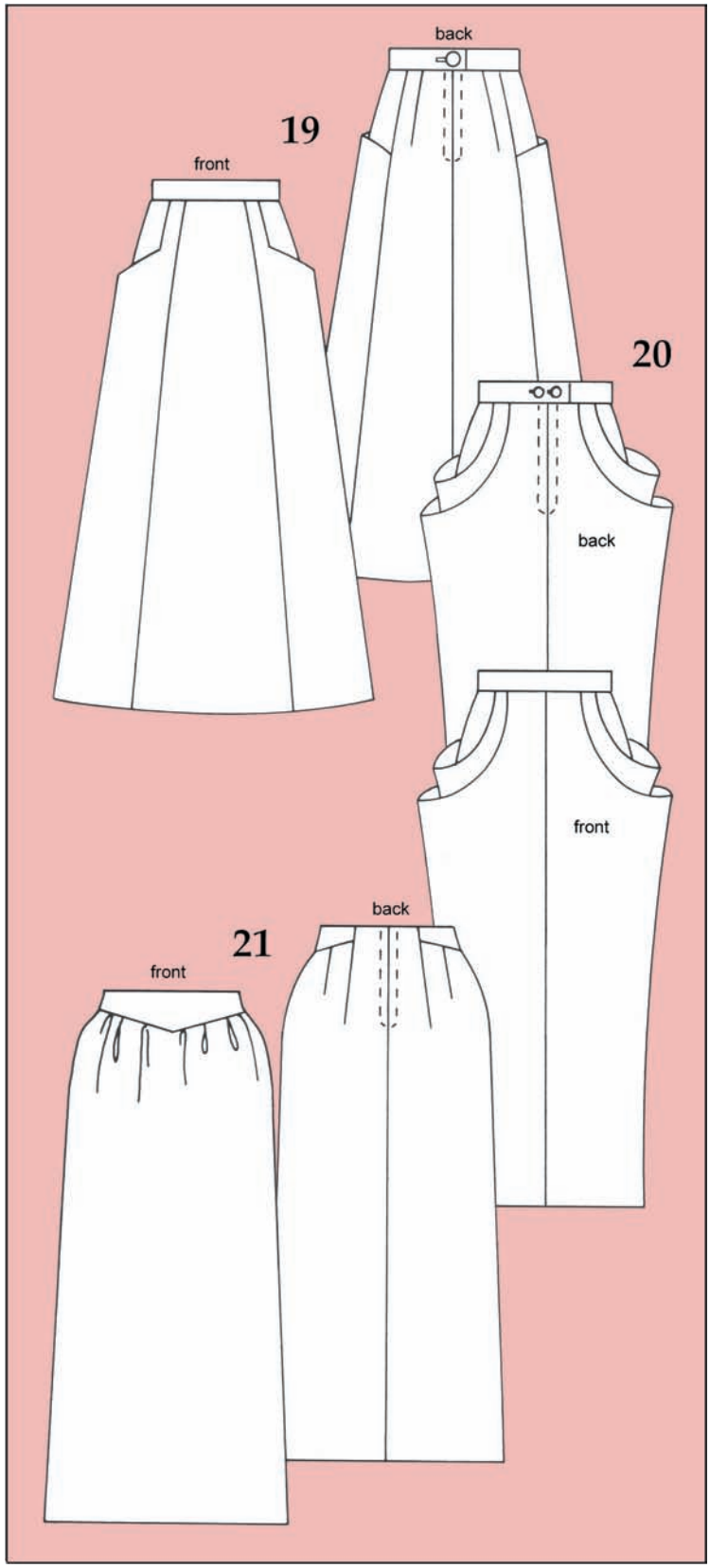




18 Flared skirt — unpressed pleats







19 Skirt with hip pocket

Trace round basic skirt block.
Draw in front and back panel lines.
Transfer front dart and one back dart onto these lines. Draw in pocket line.
Mark depth of pocket bag.
Cut up panel lines.
Back and front Trace round back and front sections, add 5 cm flare to outer edge of panel at the hem.
Lower side panel Trace round side panel; cut away along pocket line. Add 5 cm flare to side seam at hem.
Top side panel Trace round side panel to depth of pocket bag line. Add flare.
Pocket facing Trace round top side panel; cut away along pocket line.

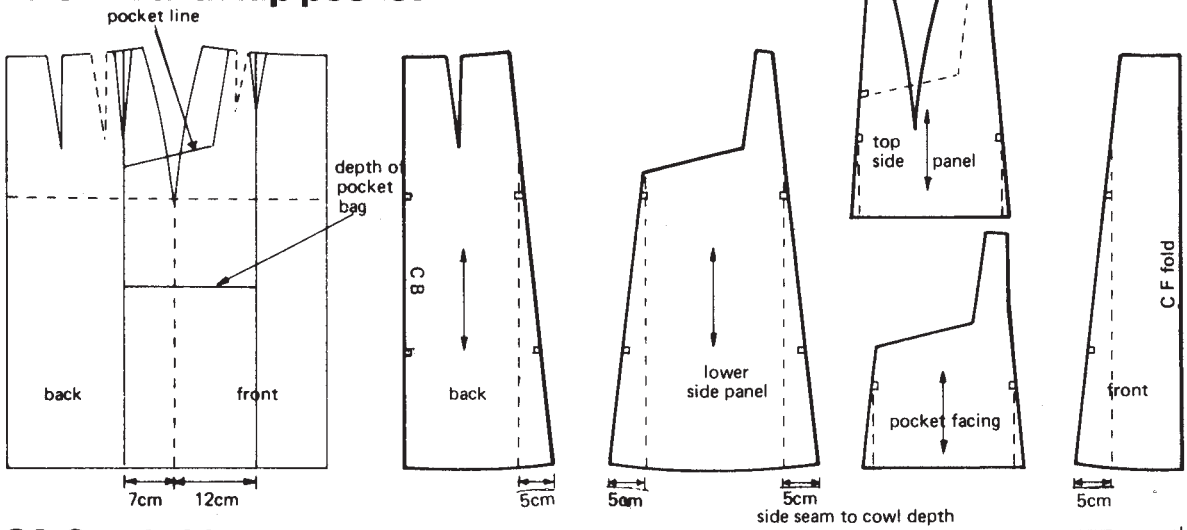
20 Cowl skirt

Trace round basic skirt block.
Mark point 1 midway between front dart and centre front. Decide the depth of the cowl lines, draw the cowl lines from the base of the darts and point 1. Cut up side seams and along cowl lines.
On a new piece of paper draw a horizontal line. Place side seams of skirt to this line and allow hem of side seams to touch. This opens the cowl lines.
Trace round pattern and make a good curve at the hem.

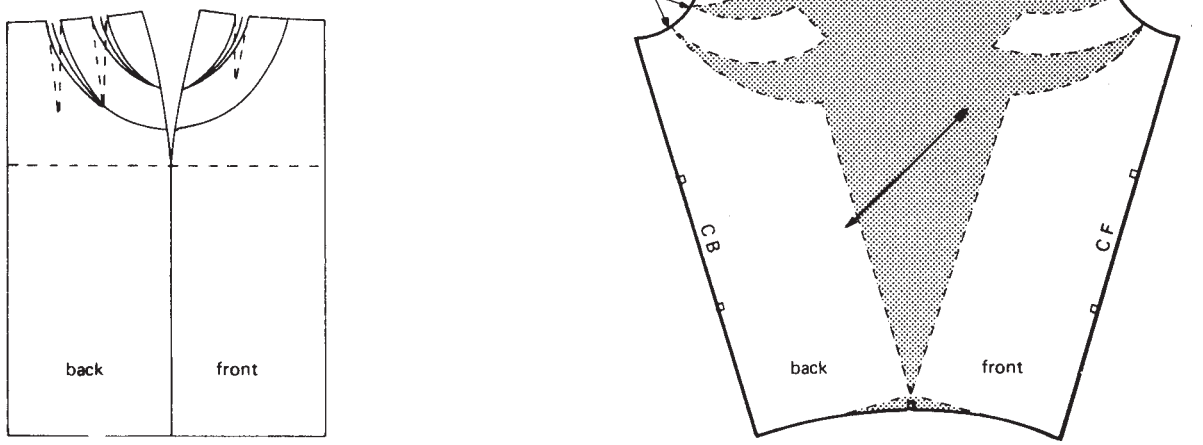
21 Skirt with gathered front

Trace round straight skirt pattern.
Draw in yoke line, number sections 1, 2, 3, 4. Divide front skirt into three sections 5, 6, 7.
Yoke Cut yoke from block, close darts; trace round pattern with good curves.
Back Cut out and trace back section.
Front Cut out front; cut up section lines. Open sections at waist only (approx. 4 cm), trace round pattern.

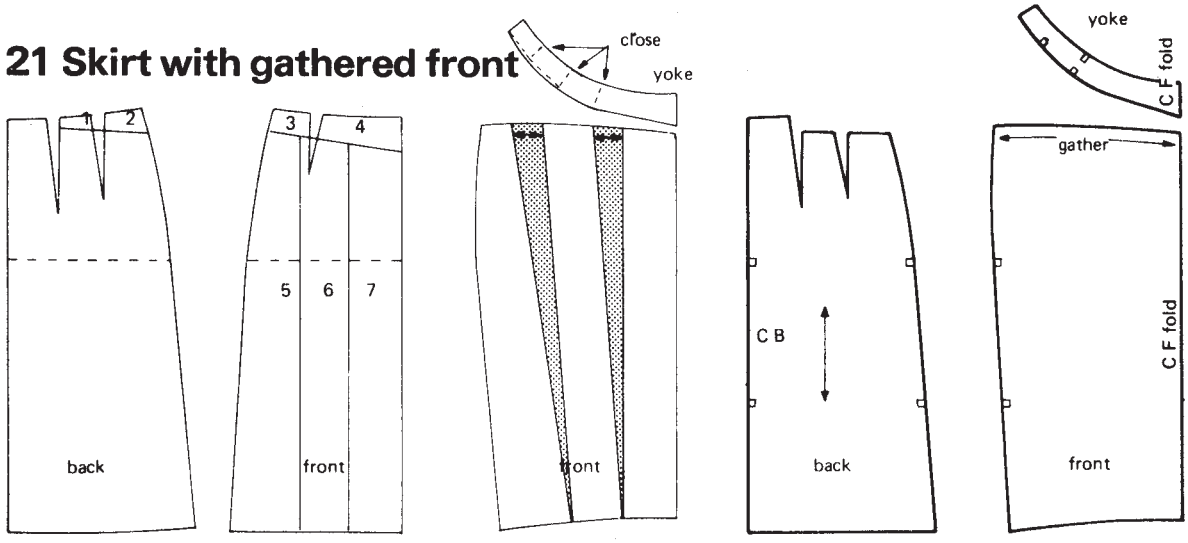
19 Skirt with hip pocket

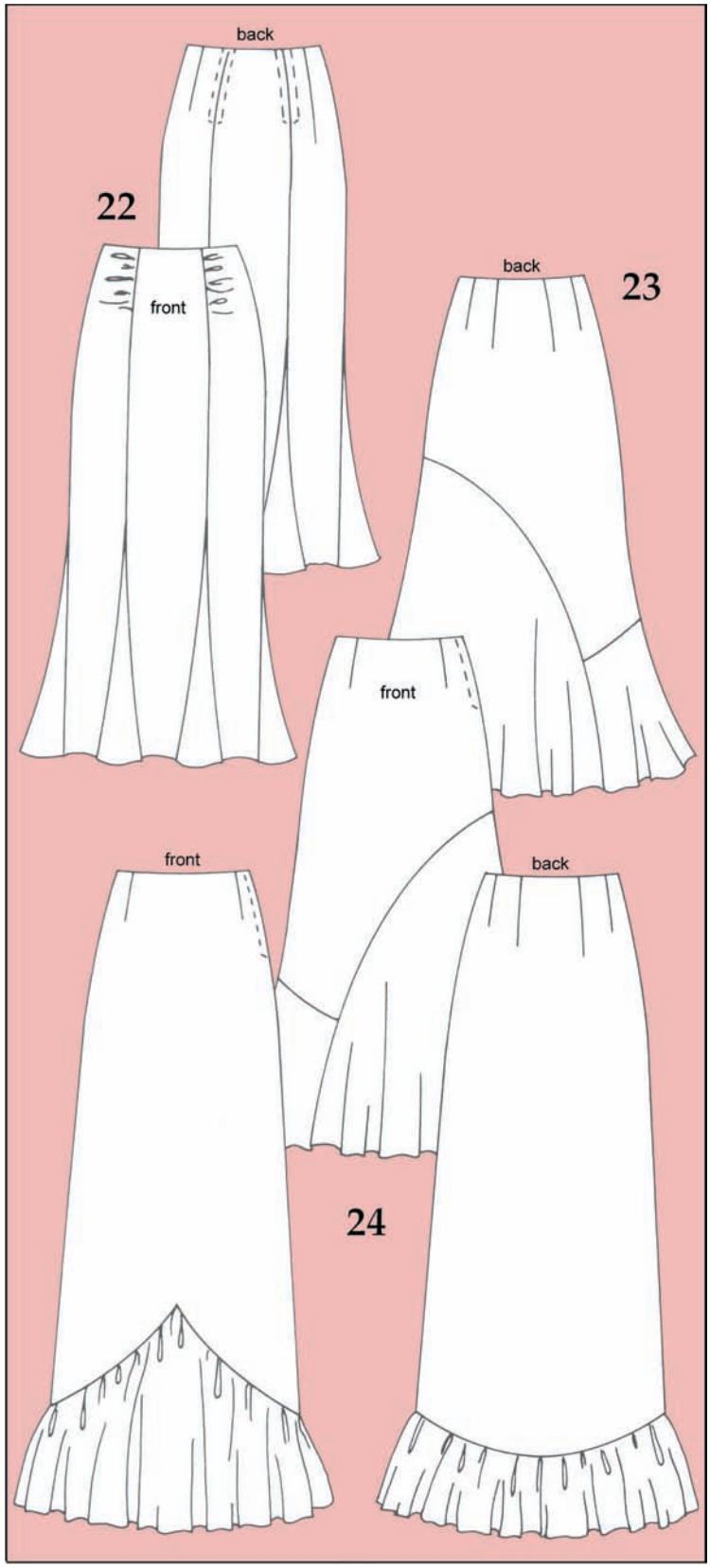


20 Cowl skirt



21 Skirt with gathered front





22 *Skirt with godets*

Trace round basic skirt block.
Draw in panel lines, transfer front dart to front panel line; mark godet points. Cut out block and cut up panel lines.
Back panels Trace round back and side back panels.
Front Trace round front panel.
Side front Divide side panel into five sections to hipline. Cut along these lines, open each section approx. 2 cm at inner edge.
Trace round pattern.
Godet Draw a vertical line; mark points 1–2 the godet length. Decide width of godet, divide the width evenly each side of line, mark points 3 and 4. Square up from these points. Mark points 5 and 6 on these lines. 1–5 and 1–6 are the length of the godet; join points 5, 2, 6, with a curve.

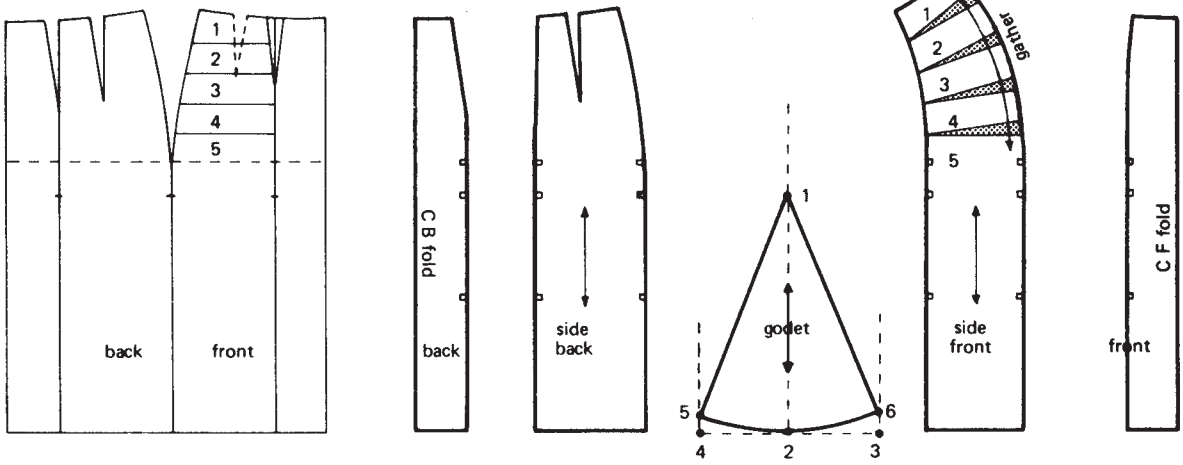
23 *Asymmetrical skirt*

Trace round basic skirt block (double sections).
Draw in lower panel lines, divide lower panels into sections. Cut away lower panels, cut up sections.
Large side flounce On a new piece of paper draw a vertical line. Place side seams of lower panel to the line. Open out each section equally at the hem the amount required for flare. Trace round pattern.
Small side flounce Repeat the instructions to create small flounce.

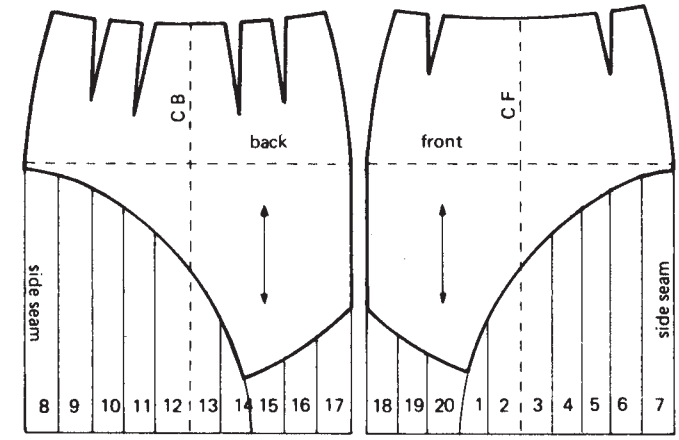
24 *Skirt with a flounce*

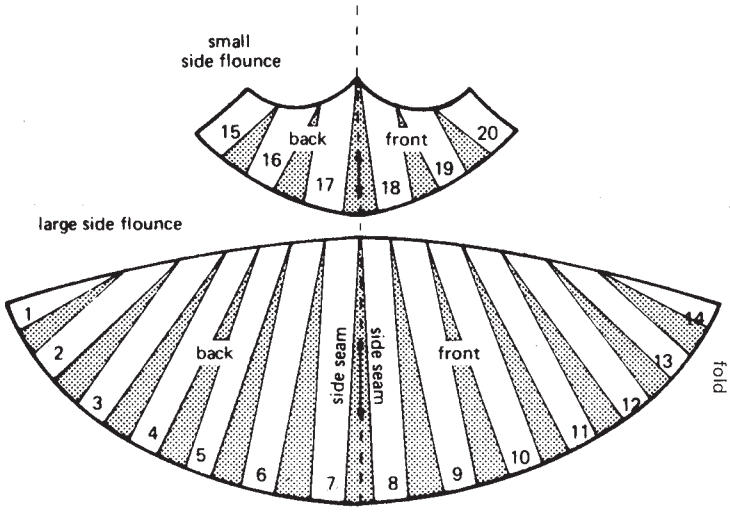
Trace round straight skirt pattern.
Draw in the lower panel lines; divide lower panels into sections. Cut away lower panels; cut up sections.
On a new piece of paper open sections approx. 4 cm at the top and 7 cm at the bottom.
Trace round new pattern making good curves.
Note It is necessary to ensure that when curved pattern pieces are opened at the top, each section is laid on a line squared out from the line of the previous section (e.g. line 1–2).

22 Skirt with godets

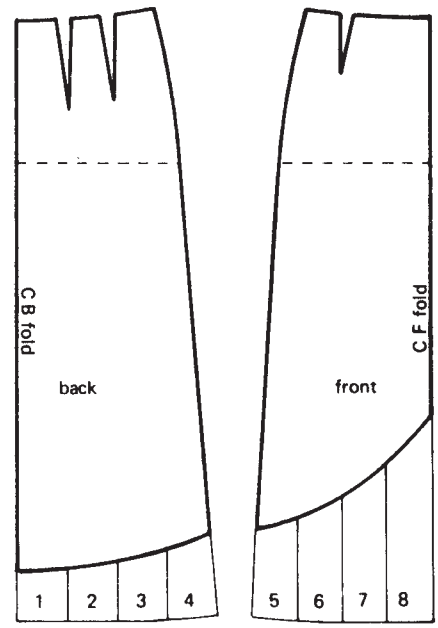


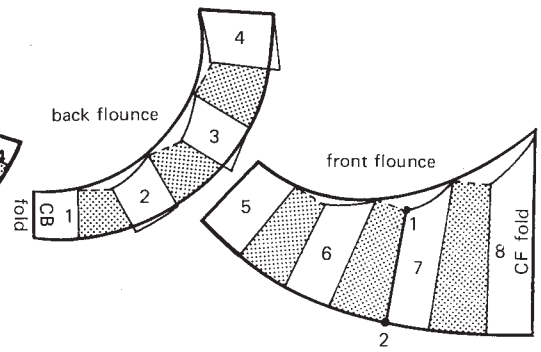
23 Asymmetrical skirt

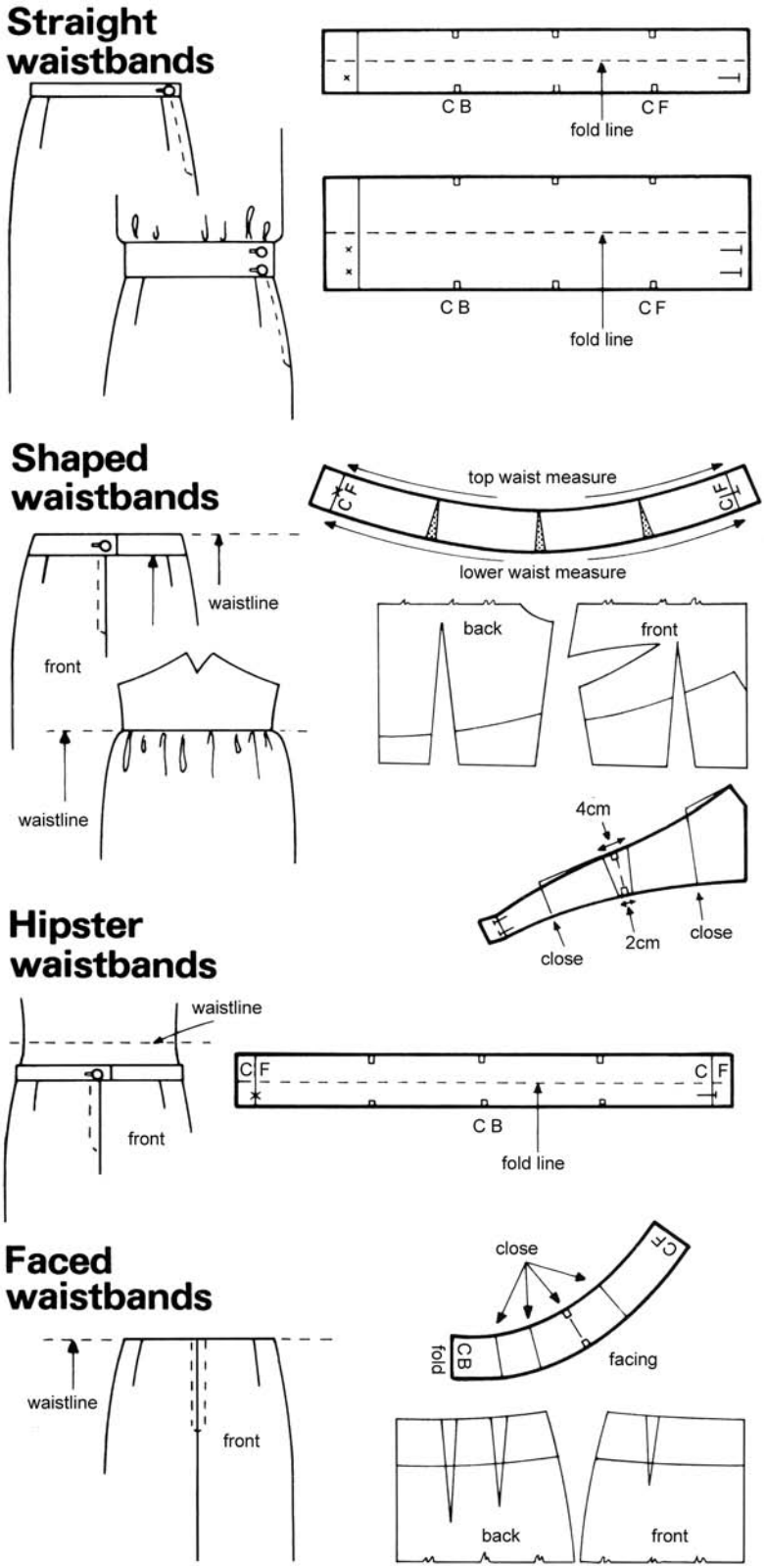




24 Skirt with a flounce







25 *Waistbands*

Straight waistbands

These waistbands are satisfactory if they are set on the waistline and are made in widths from 2.5–6 cm.
Draw waistband exact length and double the width. Mark centre back, centre front and side seam; mark fold line.
Add an underwrap of 4 cm.
Mark any buttonholes required.
The waistline and waistband of a skirt can be drafted to include a substantial amount of ease (e.g. 10 cm) to enable the waistband to be elasticated.

Shaped waistbands

Waistbands set below the waistline, or waistbands that reach high above the waist require shaping to fit the body.
Below waist Remove the waistband depth from top of skirt pattern.
Measure the new low waistline. Make a straight waistband the normal waist measurement, and single width.
Cut waistband at centre back and side seams, open the lower edge until it becomes the low waistline measurement.
Add underwrap and topwrap; mark buttonholes.
Above waist Trace shaped bodice block. Draw in waistband on block.
Cut out waistband; close darts and overlap side seams 4 cm at top, 2 cm at bottom. Trace round pattern.
Add topwrap and underwrap, mark buttonholes.
Note All shaped waistbands have to be cut singly and faced.

Hipster waistbands

Mark lowered waistline on skirt pattern approx. 6 cm below waistline and use low waist measurement for waistband.
Only very narrow straight waistbands can be used (maximum 2.5 cm). For deeper bands use the shaped waistband described above.

Faced waistbands

Trace round skirt pattern to hipline.
Mark in the lower edge of facing.
Cut out facings; close darts and place side seams together.
Trace round pattern (facing can be cut in two separate pieces).

PART ONE: CLASSIC FORM CUTTING

7 Fitted trouser blocks and adaptations

The classic tailored trouser block *100*
Tailored shorts 100
1 Culottes 102
2 Pleated culottes 102
3 Flared culottes 102
4 Trousers with pleated waistline 104
5 Flared and gathered trousers 104

The very close fitting trouser/jeans block *106*
6 Basic jeans adaptation 106
7 Hipster jeans adaptation 108

The classic tailored trouser block

Measurements required to draft the block

Measurements from any of the size charts in this book (page 12–14) or personal measurements (see page 178) can be applied to the block.
A size 12 from the size chart on page 12 (for fashion garments) is used for this illustrated example.

Note There is 1 cm ease in the waistline of the trousers. The waistline of the trousers should always be eased onto the waistband.

waist	68 cm	body rise	28 cm
hips	94 cm	waist to floor	104 cm
waist to hip	20.6 cm	trouser bottom width (page 13)	22 cm

Front
Square both ways from 0.
0–1 body rise; square across.
0–2 waist to hip; square across.
0–3 waist to floor measurement; square across.
1–4 half the measurement 1–3 minus 5 cm; square across.
1–5 one twelfth hip measurement plus 1.5 cm; square up to 6 and 7.
6–8 quarter hip measurement plus 0.5 cm.
5–9 one sixteenth hip measurement plus 0.5 cm.
7–10 1 cm; join 10–6, join 6–9 with a curve touching a point:
sizes 6–8 2.75 cm from 5
sizes 10–14 3 cm from 5
sizes 16–20 3.25 cm from 5
sizes 22–26 3.5 cm from 5
10–11 quarter waist plus 2.25 cm.
Construct a dart on the line from 0; length 10 cm, width 2 cm.
3–12 half trouser bottom width minus 0.5 cm.
4–13 the measurement 3–12 plus 1.3 cm (sizes 16–20 1.5 cm; 22–24 1.7 cm).
Draw in side seam through points 11, 8, 13, 12; curve hipline outwards 0.5 cm.
3–14 half trouser bottom width minus 0.5 cm.
4–15 the measurement 4–13.
Draw inside leg seam 9, 15, 14; curve 9–15 inwards 0.75 cm.

Back
5–16 quarter the measurement 1–5; square up to 17 on the hipline, 18 on the waistline.
16–19 half the measurement 16–18.
18–20 2 cm.
20–21 2 cm.
21–22 quarter waist plus 4.25 cm; join 21–22 to touch the horizontal line from 0.
9–23 half the measurement 5–9.
23–24 0.5 cm.
Join 21–19 and 19–24 with a curve touching a point:
sizes 6–8 4 cm from 16
sizes 10–14 4.25 cm from 16
sizes 16–20 4.5 cm from 16
sizes 22–26 4.75 cm from 16
17–25 quarter hip plus 1.5 cm.
12–26 1 cm.
13–27 1 cm.
Draw in side seam through points 22, 25, 27, 26; curve hipline outwards 0.5 cm, curve 25–27 inwards 0.5 cm.
14–28 1 cm.
15–29 1 cm.
Draw inside leg seam 24, 29, 28; curve 24–29 inwards 1.25 cm.
Divide the line 21–22 into three parts. Mark points 30 and 31. Using the line 21–22, square down from 30 and 31.
Construct darts on these lines 2 cm wide; length from point 30 12 cm, length from point 31 10 cm.
Curve hemline down 1 cm at point 3.

Note For extra ease in the crutch line see the adaptation on page 104, ref. 4.

Trace off back and front sections. It is usual for the back block to face to the left and the right block to face to the right, particularly if the design requires complicated adaptations.

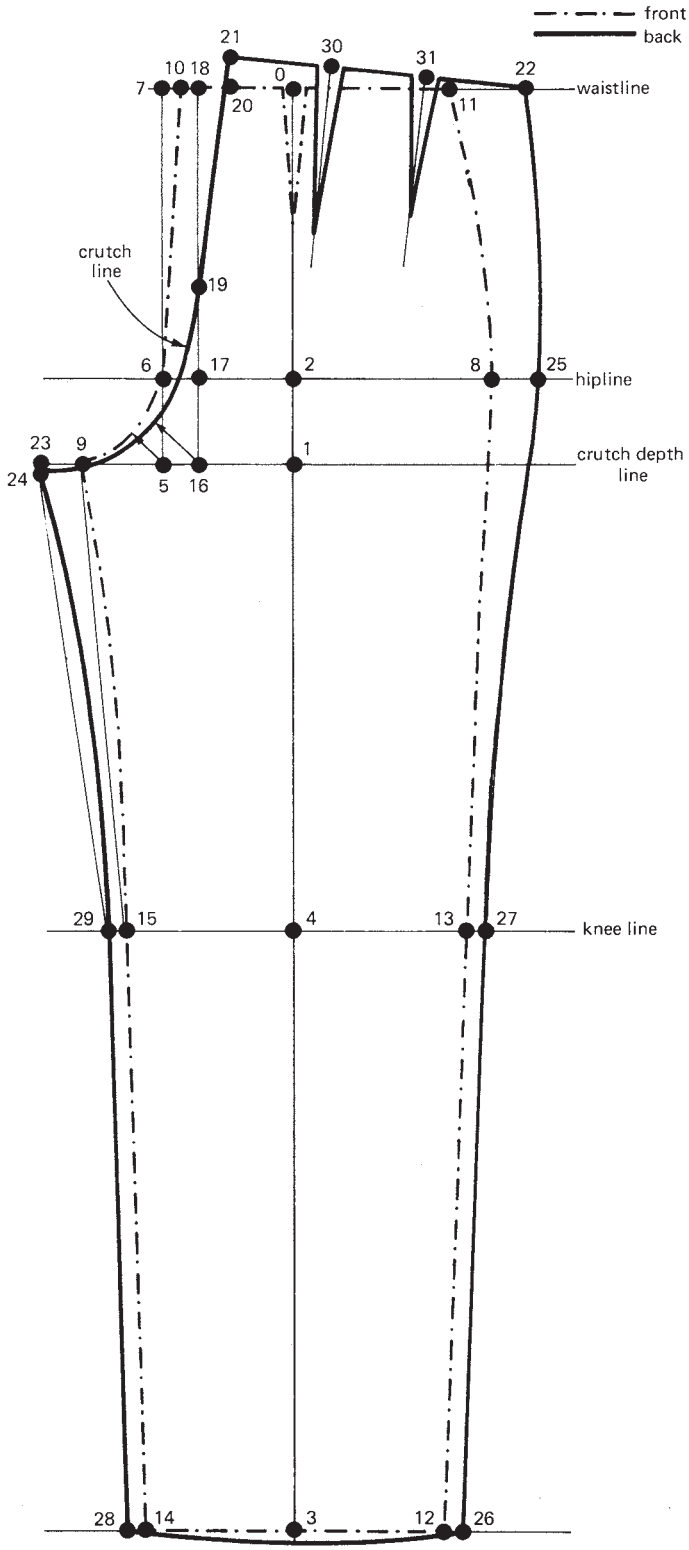
Tailored shorts

Shorts can be constructed from any of the trouser blocks depending on the style.
Trace round trouser block required.
Draw a line parallel to the body rise line at depth required.
Curve the back hemline downwards 1 cm.
Continue adaptation.

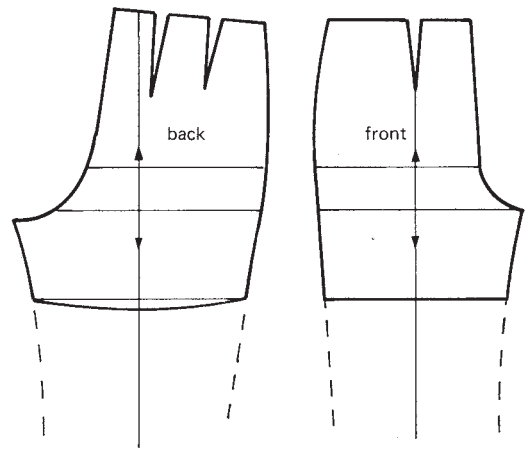
Alternative leg shaping

The fashion outline of trouser legs constantly alters; the diagram shows alternative leg shaping. If classic shaping is required, equal amounts are added or subtracted to each side of each leg as shown in the diagram.

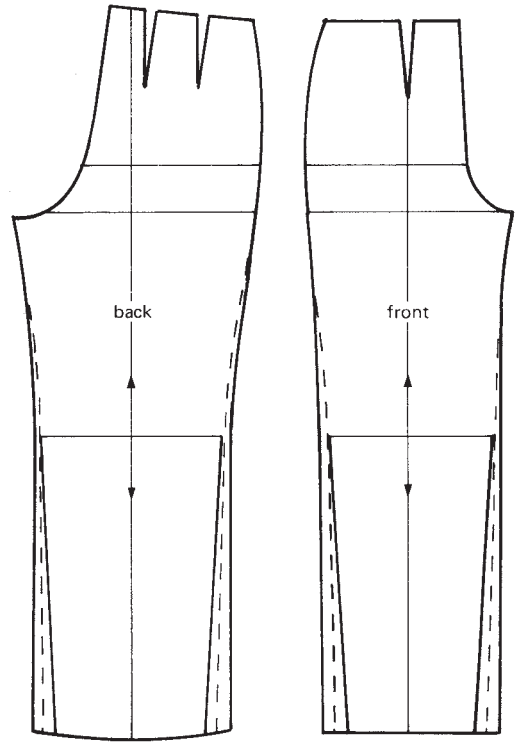
The classic tailored trouser block

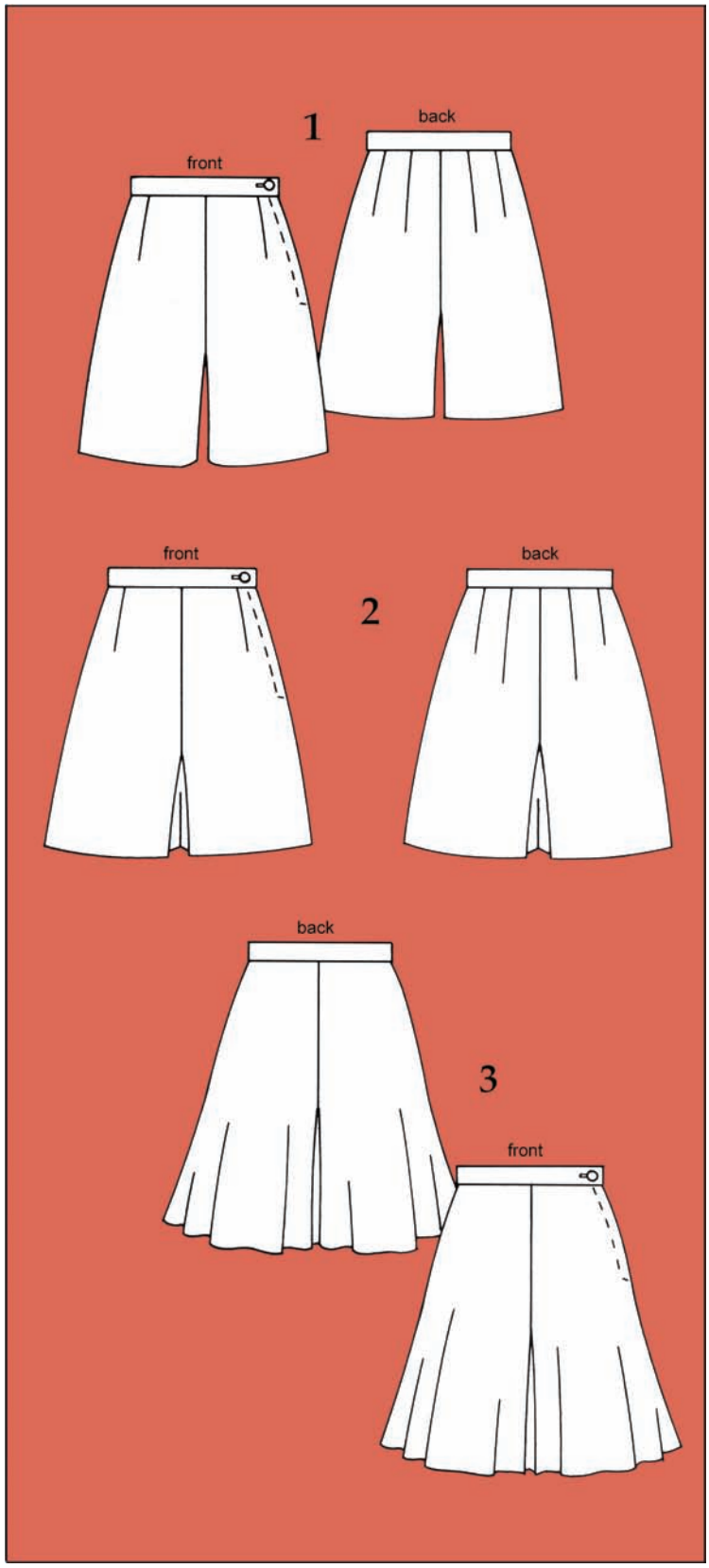


Tailored shorts



Alternative leg shaping





1 *Culottes*

Draw round straight skirt pattern, mark the hipline. Mark hemline depth. Cut off.
Back Mark 0 at centre back waist.
0–1 body rise plus 1.5 cm.
0–2 finished length.
1–3 half 0–1 plus 1 cm.
1–4 one eighth hip measurement plus 2 cm; square down to hemline.
Join 3 to 4 with a curved line touching a point 3 cm from 1.
Front Mark 5 at centre front waist.
5–6 body rise plus 1.5 cm.
5–7 finished length; square across.
8 is midway between 5 and 6.
6–9 one eighth hip measurement less 2 cm; square down to hemline.
Join 8 to 9 with a curved line touching a point 4 cm from 6.

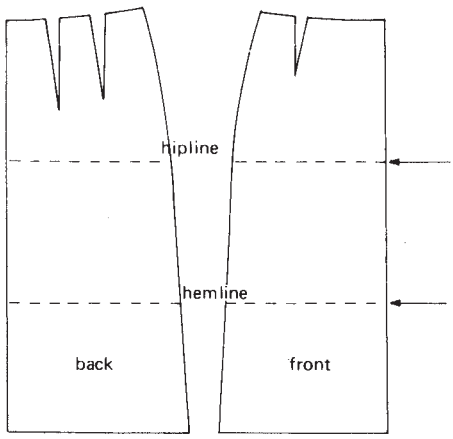
2 *Pleated culottes*

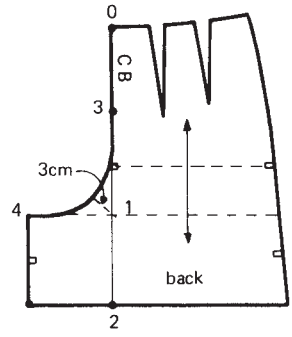
Trace round culotte pattern.
Separate inside leg sections from the skirt section.
On a new piece of paper trace round skirt sections.
Add an 8 cm vent pleat (total 16 cm) to centre front and centre back.
Place inside leg sections to edge of pleat; trace round.
Fold pleats towards the side seams and cut out patterns.

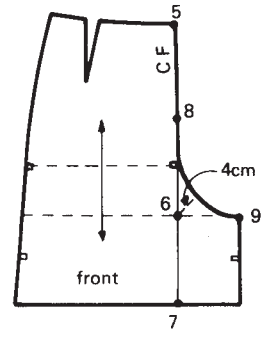
3 *Flared culottes*

Trace round culotte pattern.
Back Drop vertical lines from the base of darts to hem.
Cut out pattern and cut up the lines.
Close darts to make flare at the hemline.
Trace round pattern on a new piece of paper. Cut out.
Front Drop vertical lines from the front dart and a point midway between dart and the centre front.
Close dart to make flare at the hemline, open the other vertical line to make the same amount of flare.
Trace round pattern on a new piece of paper. Cut out.

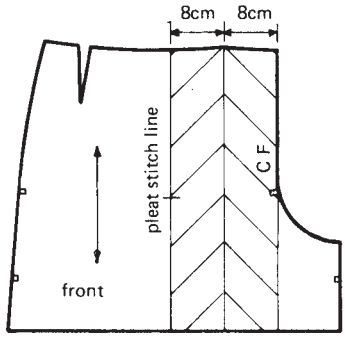
1 Culottes

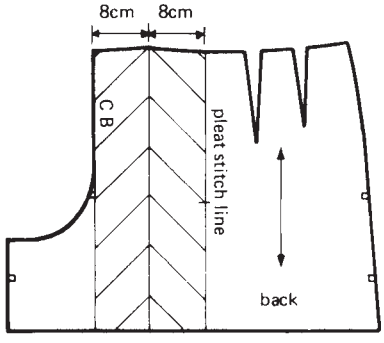




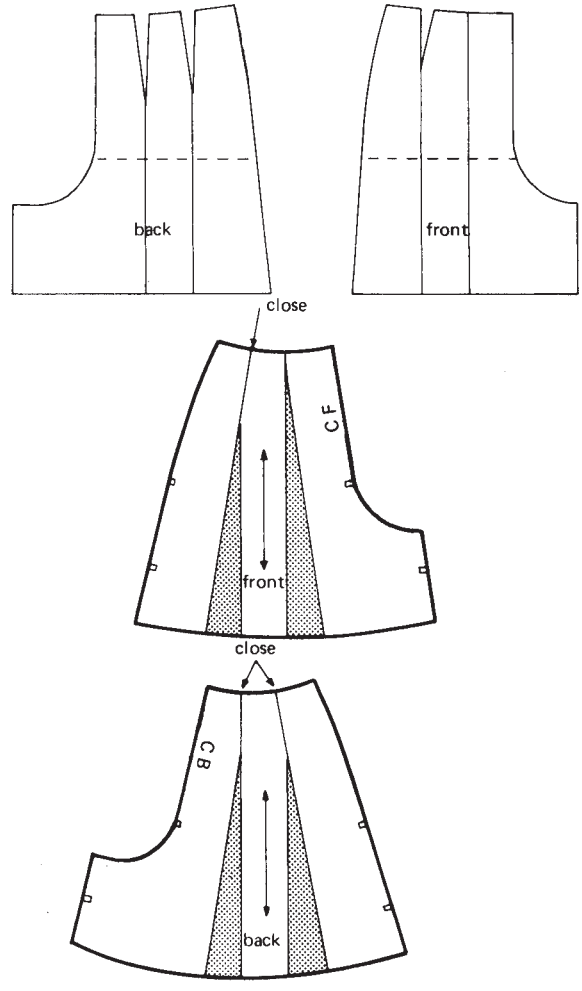


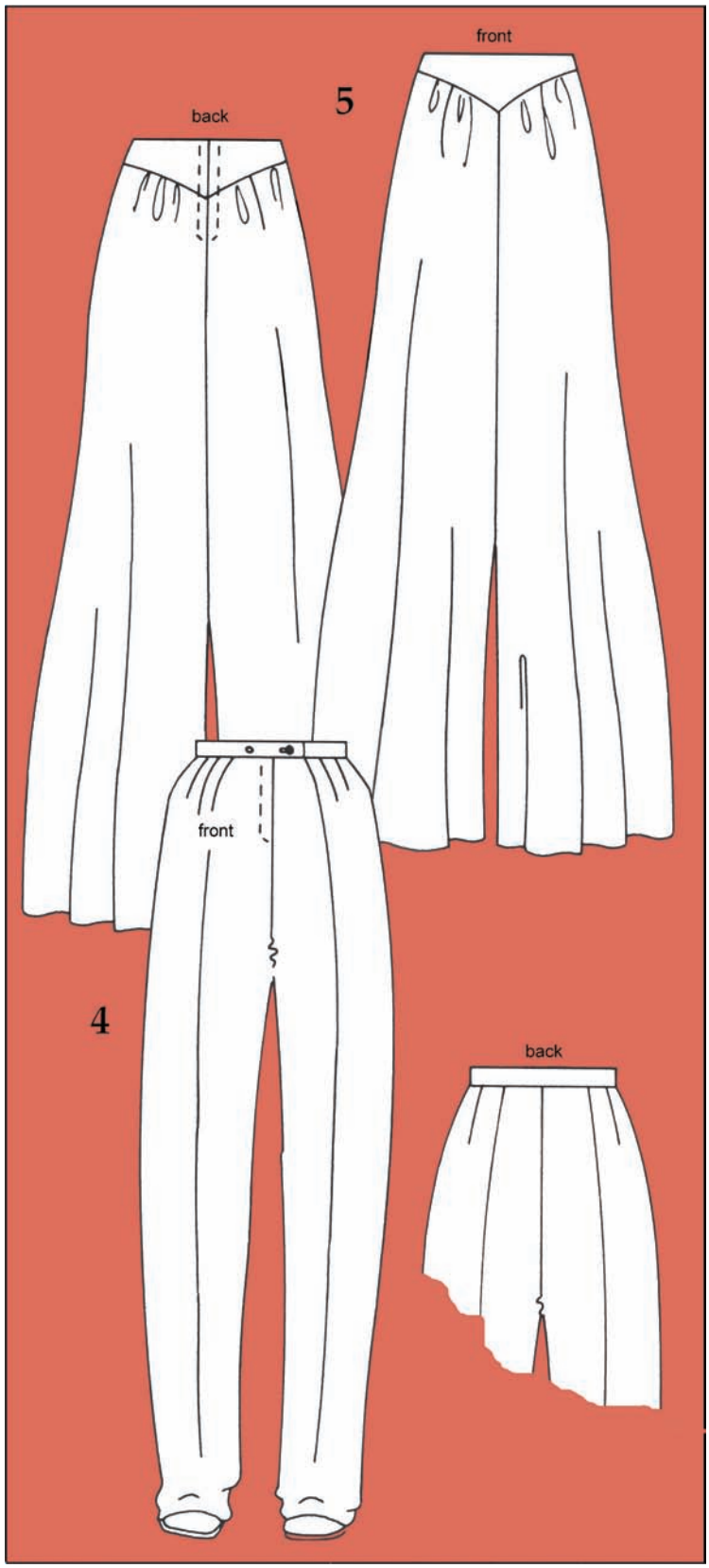
2 Pleated culottes





3 Flared culottes





4 *Trousers with pleated waistline*

Trousers that are full at the waistline and shaped in at the hem.
Trace round basic trouser block.
Back Cut along the hipline and open a wedge approx. 3 cm wide at back crutch line.
Mark points 1 and 2 on hemline 1.5 cm in from leg seam.
Draw lines from 1 and 2 to knee line.
Front Trace round front trouser block. Cut across knee line, divide top section along the grain line.
Open 5 cm at waistline, extend waistline by 3.5 cm at side seam. With dart allowance this gives 10.5 cm fullness.
Divide this into three 3.5 cm pleats.
Mark points 3 and 4 on hemline 1.5 cm in from leg seam.
Draw lines from 3 and 4 to knee line.

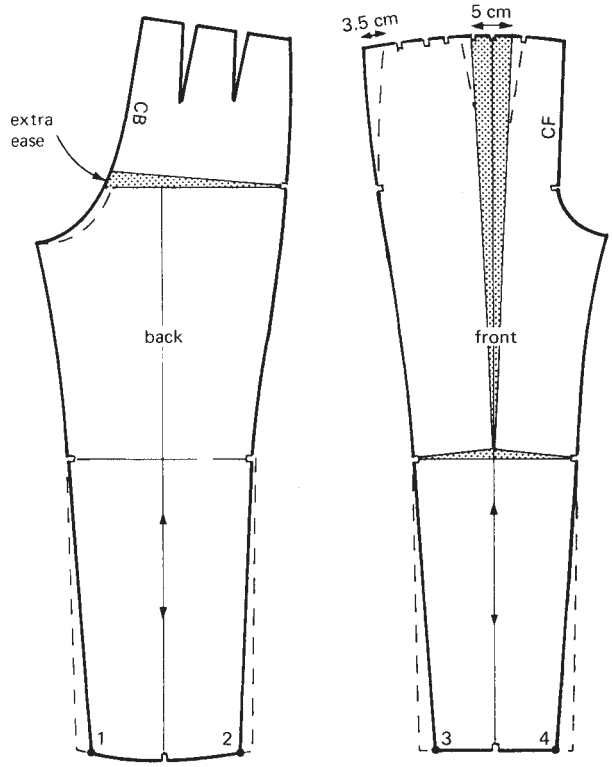
Note More fullness can be added at the waistline by opening the grain line further at the waistline and making deeper pleats.

Waistband Construct waistband required (page 98).

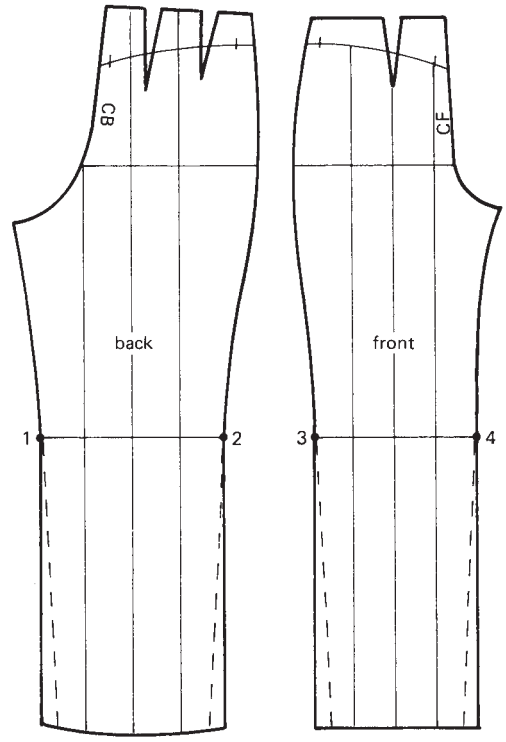
5 *Flared and gathered trousers*

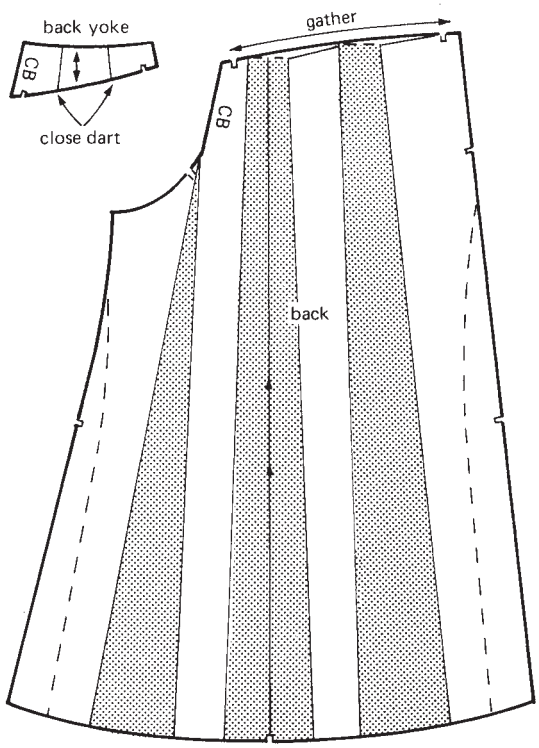
Trace round basic trouser block.
Square down to hem from points 1, 2, 3, 4 on knee lines.
Draw yoke lines on back and front trousers. Cut away yokes. Close darts. Draw round new shapes.
Divide back and front trousers into four sections at knee line. Square up and down. Erase darting.
Cut up vertical lines, open sections so that the opening at the hem is double that of the waist (example shows 6 cm at waist, 12 cm at hem).
The vertical line to the back crutch line is opened only at the hem.
Add 5 cm flare to hem of inside leg seams and side seams.

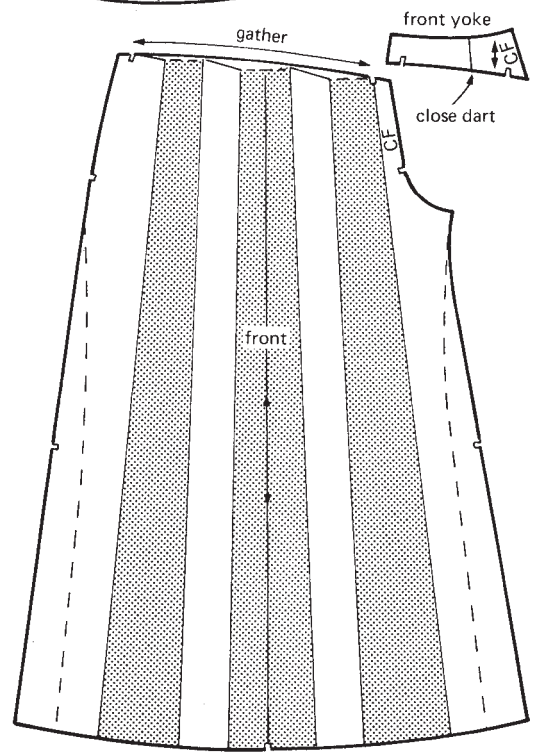
4 Trousers with pleated waistline



5 Flared and gathered trousers







Draw round new shapes.

The very close fitting trouser/jeans block

Trousers or jeans made from close fitting blocks are often made from fabrics with slight stretch to provide a 'comfort fit'. This block is drafted so that the top of the waistband sits along the waistline. Many jeans are drafted to sit below it. See the instructions in brackets (2 cm below the waistline), or the 'hipster' block on page 108 can be used.

The wedge in the back crutch line should be used for close fitting trousers (see the jeans adaptation, point 17–34).

Measurement required to draft the block

Measurements from any of the size charts in this book (page 12–14) or personal measurements (see page 178) can be applied to the block.
A size 12 from the size chart on page 12 (for fashion garments) is used for this illustrated example.

waist	68 cm	body rise	28 cm
hips	94 cm	waist to floor	104 cm
waist to hip	20.6 cm	jeans bottom width (page 13)	
waistband depth	4 cm		19 cm

Front
Square both ways from 0.
0–1 body rise minus 4 cm (6 cm); square across.
0–2 waist to hip minus 4 cm (6 cm); square across.
0–3 waist to floor measurement; square across.
1–4 half the measurement 1–3 minus 5 cm; square across.
1–5 one twelfth hip measurement; square up to 6 and 7.
6–8 quarter hip measurement minus 1.5 cm.
5–9 one sixteenth hip measurement minus 1 cm.
7–10 2 cm.
Join 10–6 and 6–9 with a curve touching a point:
sizes 6–14 3.25 cm from 5
sizes 16–24 3.5 cm from 5
10–11 quarter waist plus 1.5 cm (2 cm).
3–12 half jeans bottom width minus 1 cm.
4–13 the measurement 3–12 plus 2 cm.
Draw side seam 11, 8, 13, 12; curve 11–8 out 0.25 cm; continue the side seam curve to 13.
3–14 half jeans bottom width minus 1 cm.
4–15 the measurement 3–14 plus 2 cm.
Draw inside leg seam 9, 15, 14. Curve in 9–15 0.75 cm.

Back
5–16 quarter measurement 1–5; square up to 17 on the hipline, 18 on the waistline.
16–19 half the measurement 16–18 plus 1 cm (2 cm).
18–20 2 cm.
20–21 2 cm.
21–22 quarter waist plus 4 cm (4.5 cm). Join 21–22 to touch the line squared out from 0.
9–23 the measurement 5–9 minus 0.5 cm.
23–24 0.5 cm. Join 21–19 and 19–24 with a curve touching a point:
sizes 6–14 4.5 cm from 16
sizes 16–24 4.75 cm from 16
17–25 quarter hip measurement plus 1.5 cm.
12–26 2 cm.
13–27 2 cm.
Draw side seam 22, 25, 27, 26; curve 22–25 out 0.5 cm, continue the side seam curve to 27 as shown.
14–28 2 cm.
15–29 2 cm.
Draw inside leg seam 24, 29, 28; curve 24–29 in 1 cm.
21–30 half the measurement 21–22; square down from line 21–22. Construct a dart on this line, width 1.25 cm (1 cm), length 8 cm.

6 Basic jeans adaptation

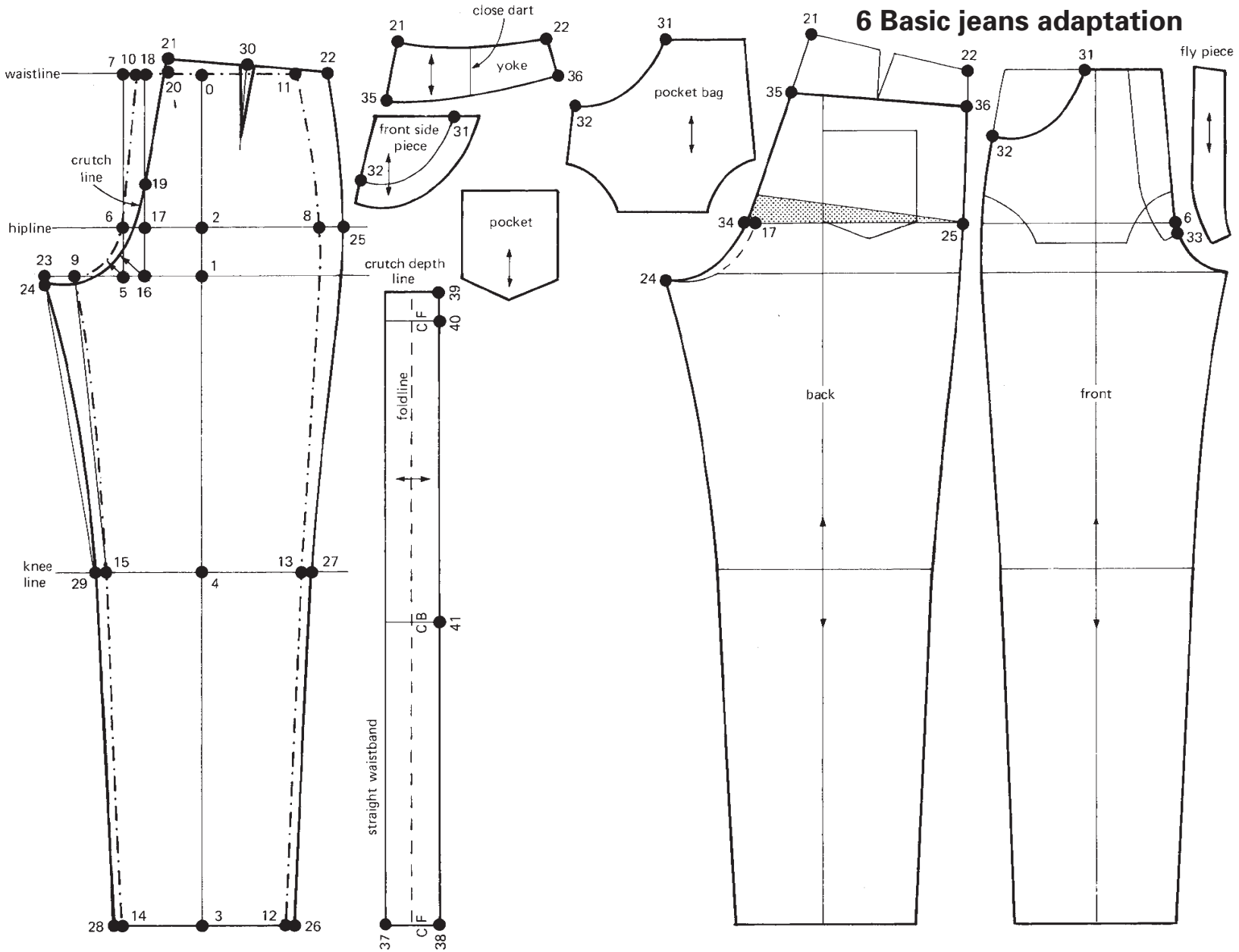
Front Trace off front section; mark point 6.
Draw in curved pocket line 31–32 and pocket bag. Cut off side piece along the line 31–32; add 3.5 cm from 31–32.
Draw in fly piece shape to point 33, 1 cm below 6. Fly piece width 3.5–4 cm. Trace off fly piece. Trace off pocket bag along the line 31–32.

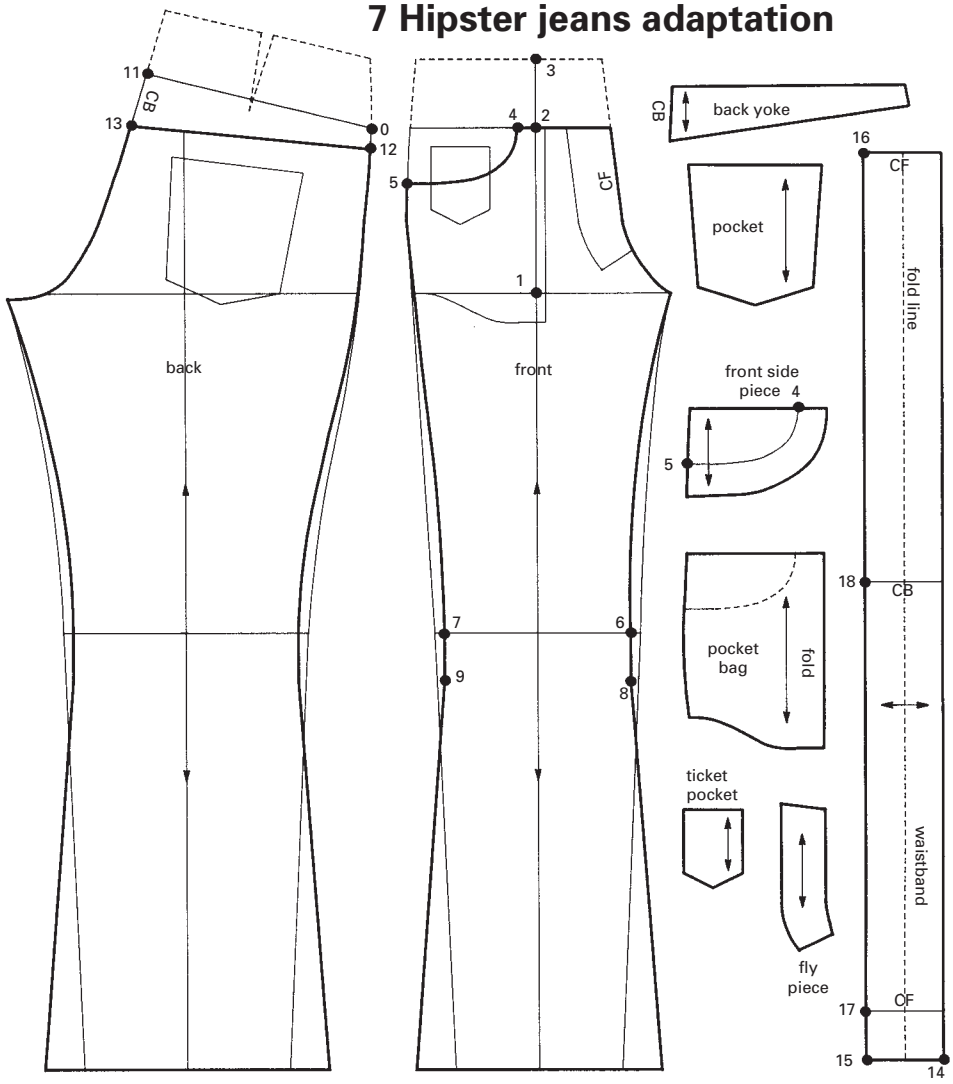
Back Trace off back sections; mark points 17, 21, 22, 24, 25. Cut along hipline 17–25, open a wedge approx. 3.5 cm wide at 17.
17–34 1 cm; draw in new crutch line from 21–24.
Draw in pocket design.
21–35 quarter the measurement 21–34.
22–36 quarter the measurement 22–25.
Cut off yoke along the line 35–36; close dart. Curve the lines 21–22 and 35–36.

Patch pocket Trace off back pocket.

Waistband The straight waistband is cut 8 cm (11 cm) larger than the waist measurement to fit the lower waist positions.
Square both ways from 37.
37–38 twice waistband depth; square across.
38–39 waist measurement plus fly width; square up.
39–40 fly width; square up.

6 Basic jeans adaptation





38–41 half the measurement 38–40; square up.
Mark fold line down the centre.

7 Hipster jeans adaptation

Trace off the basic jeans block with wedge at the crutch line.

Front Mark point 1 on crutch depth line of centre line.
1–2 body rise minus 11 cm; square across for new low waistline. Mark point 3 on old waistline.
Draw in curved pocket line 4–5 and pocket bag.
Draw in ticket pocket.
Cut off side piece along the line 4–5; add 3.5 cm from 4–5.
Trace off pocket bag. Trace off ticket pocket.
Draw in fly piece shape; fly piece width 4 cm.
Trace off fly piece.
Shape new side and inside leg seams.
Shape in approx. 0.5 cm at the knee line to 6 and 7.
Square down 5 cm from 6 and 7 to 8 and 9.
Add approx. 4 cm flare to each side of the hemline.
Join 8 and 9 to new hemline points.
Back Draw a line 10–11 parallel to the old waistline, the distance is the measurement 2–3 on front section. Draw in a new yoke line 12–13 from a point approx. 2.5 cm below 10.
Draw in back pocket.
Trace off back yoke. Trace off back pocket.
Shape new side and inside leg seams as for the front pattern.

Waistband Measure the waistline of the new draft. Square both ways from 14.
14–15 twice waistband depth; square up.
15–16 new waist measurement plus 4 cm fly width; square across.

PART ONE: CLASSIC FORM CUTTING

8 Complex adaptations of the bodice blocks: dresses, jackets, coats

These adaptations are all based on *form cutting* with the bust dart. However, the amount of darting that the designer uses should be influenced by the fabric selected.

Fabrics with stretch characteristics will expand to cover the form, so many designers of casual stretch garments use *flat cutting*. However, it can be very rewarding to use fabrics with some stretch content with all kinds of *form cutting*. This allows the designer to cut closer to the form yet still create some structure in the design.

Whilst many casual garments are *flat cut*; they can also be *form cut* using the easy fitting jacket and coat blocks (see adaptation ref. 5 page 128).

Lingerie and form fitting dresses *110*
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2 Vertical seams 110
3 Strapless bodice 110
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5 'V' neck 112

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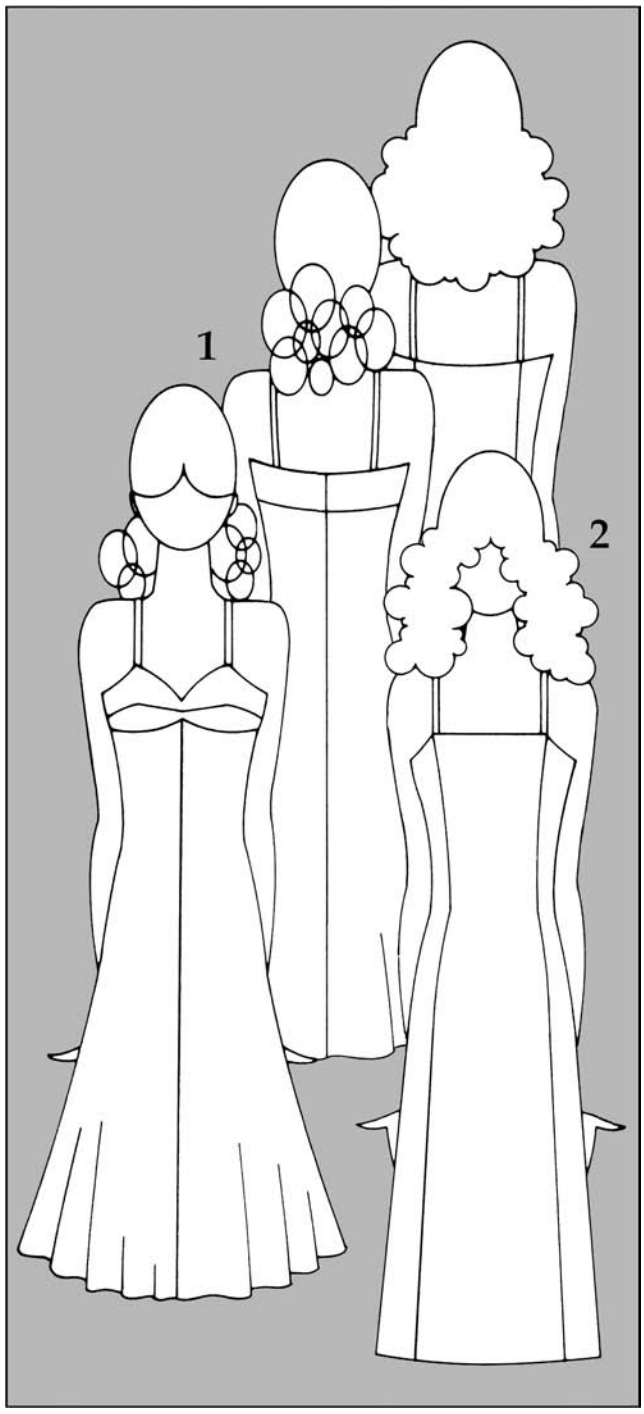
Classic coat and jacket linings 130

This book has been written for beginners. Although a tailored jacket block and a few tailored styles are included, to cover the cutting of tailored garments in greater depth see the book *Pattern Cutting for Tailored Jackets: Classic and Contemporary* (also by Winifred Aldrich).



Lingerie and form fitting dresses

For close fitting lingerie, decollete night and evening wear, widen the dart of the close fitting dress block and reduce some of the ease.
Trace round the close fitting dress block.
Reduce each side seam 1.5 cm at bust, 0.5 cm at the waist to 0.25 cm at the hips.
Double the width of the bust dart.

Some lingerie and most 'lingerie type' dresses made in fabrics with stretch, that are cut on the cross or are body-skimming rather than body-fitting, do not always need the wider dart and some may even use a reduced dart.

The skirts or panels of the petticoats can be cut on the cross in woven fabric or on the straight in knitted fabrics. If non-stretch fabric is used a small opening may be required at the back or side seam.

1 'Bra' top

Trace round lingerie block to required length.
Draw in shaped top of front and back bra. Draw horizontal line through bust point.
Trace off bra sections. Cut out.
Bra sections Close back dart, trace round.
Widen bust dart by 1.5 cm. Cut across vertical line. Close top and bottom darts.
Trace round upper and lower sections.
Skirt Rub out waist darts, take amount equivalent of dart shaping out at the seams, half at side seams and half at centre front and centre back seams.
Add 5 cm flare to hem of front and back seams, 8 cm flare to side seams.

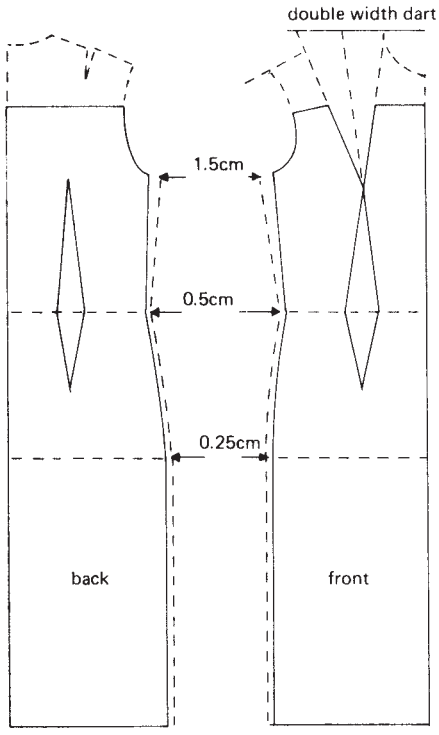
2 Vertical seams

Trace round lingerie block to required length.
Draw in shape of petticoat top. Widen bust dart by 1 cm. Drop vertical lines from the base of waist darts. Cut out panels, trace round. Shape seams of panels.
Add 2 cm flare to hem of panel seams, 3 cm flare to hem of side seam.

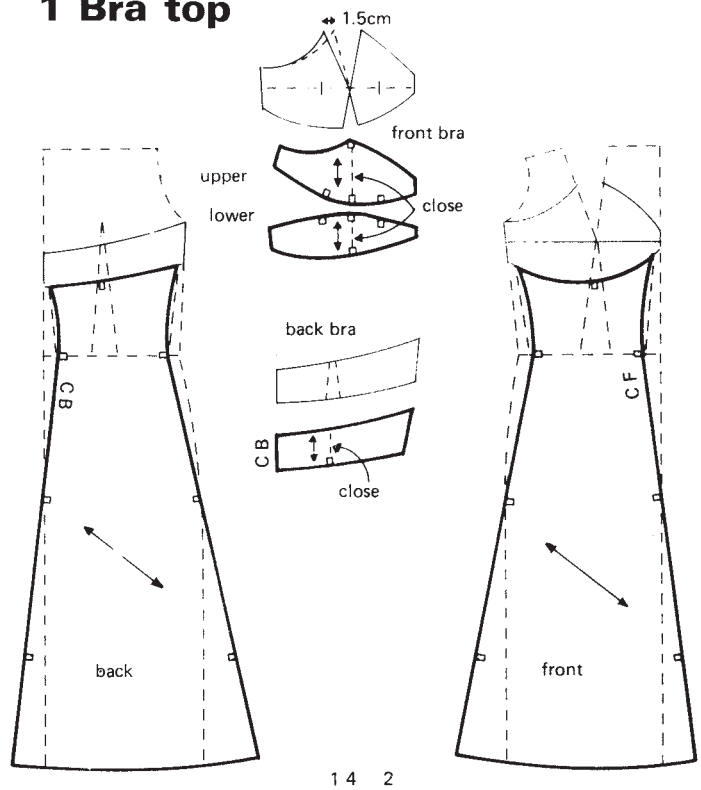
3 Strapless bodice

Lower waistline 1 cm at centre front on lingerie block; join to centre back line.
Complete adaptation of the princess line petticoat to waistline or depth required.
Trace off panels.
Shape back panel at centre back waistline 1 cm.
Reduce both side seams by 1 cm at top edge only; redraw top edge shaping.
Shape waist of front panel seam on front and side front 1 cm.
Mark points 1, 2, 3 on front panel.
1–4 = one third measurement 1–2; 2–5 = one fifth measurement 2–3.
Draw in new shaping at top edge.

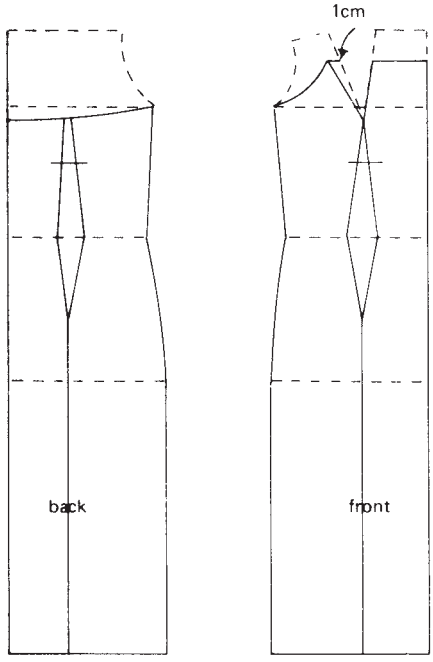
Increasing the dart



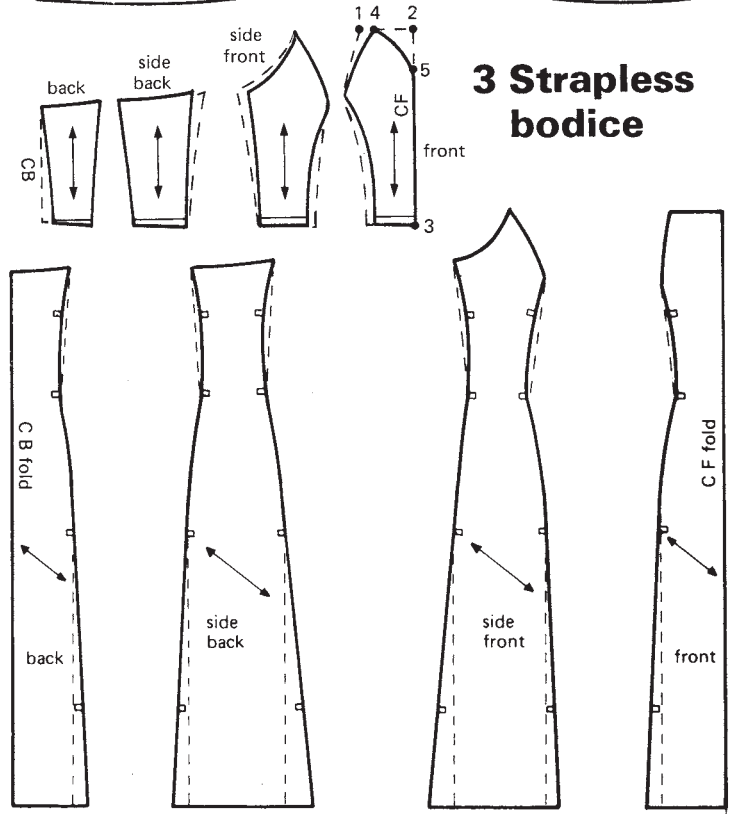
1 'Bra' top

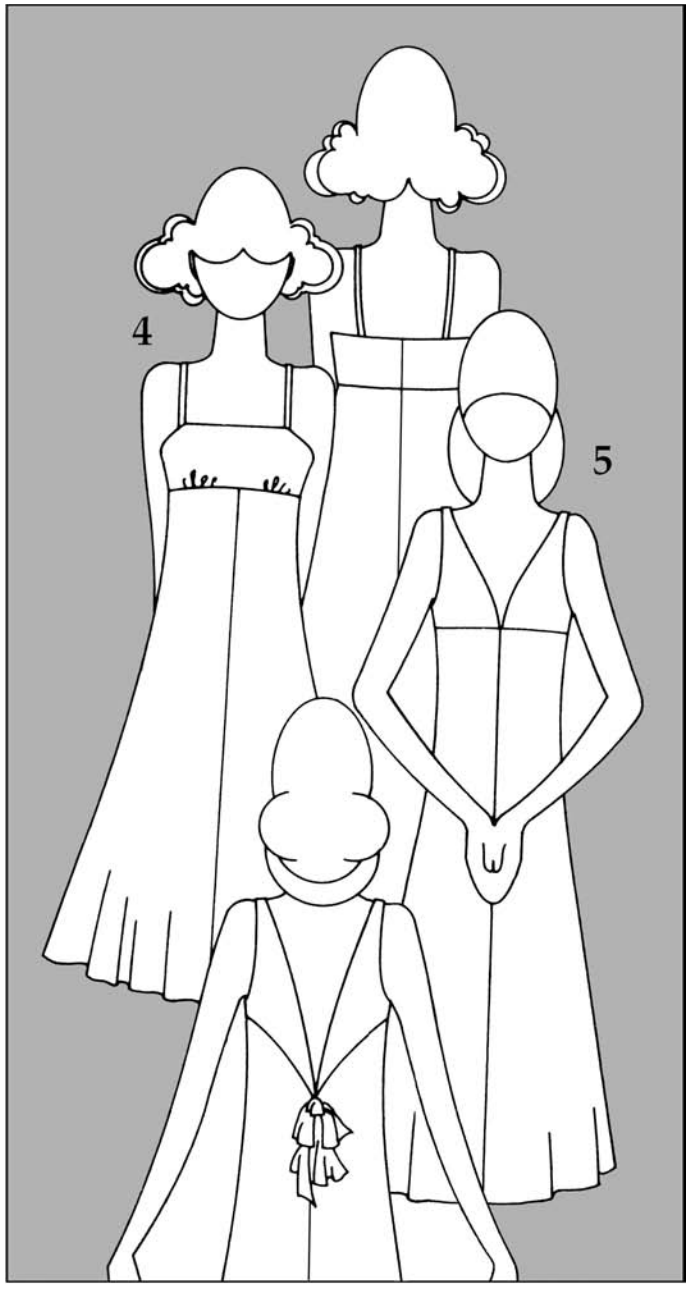


2 Vertical seams



3 Strapless bodice





The skirts hang better if woven fabric is cut on the cross.

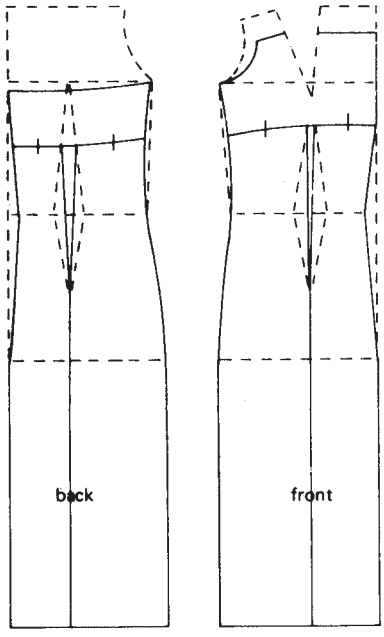
4 Camisole top

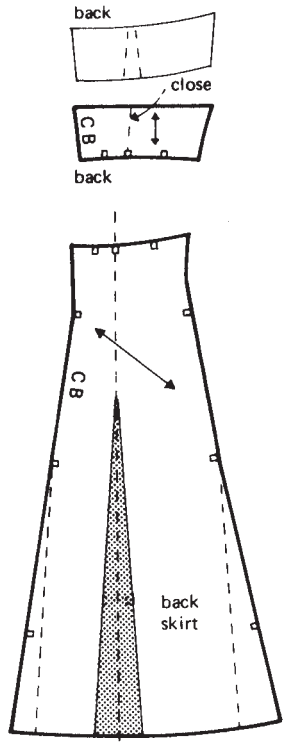
Trace round lingerie block. Drop vertical lines from base of waist darts. Draw in camisole top. Shape the high waistline with slight curve.
Cut away top sections. Shape side seams. Shape in front and back waist 2 cm.
Top sections Close back dart, trace round section. Widen bust dart 1.5 cm. Close bust dart, trace round pattern.
Skirt Reshape waist darts from high waistline to base of darts.
Cut out skirt. Cut up vertical lines. Close darts and insert 7 cm flare at hem. Grain line runs down centre of opening.
Add 6 cm to hem of side seam and 4 cm flare to centre front and centre back seams.

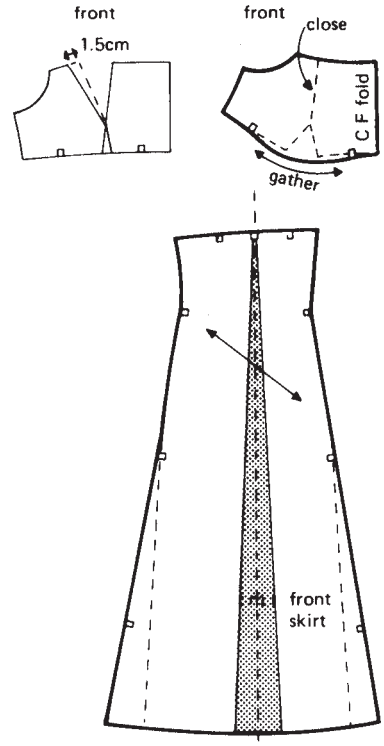
5 'V' neck

Trace round complete lingerie block. Draw in shaped waistline from back waist point.
Back bodice Draw in 'V' neck and armscye shape. Make 1 cm dart in neckline. Cut out section, close neck dart and waist dart.
Trace round with smooth curved lines.
Front bodice Draw in neckline (check distance from neck point equals that on back).
Cut out section, close bust dart, trace round with smooth curved lines.
Skirts Rub out waist darts, shape in side and front seams as shown, the same amount that is removed by closing the darts in the upper sections.
Cut out skirts. Trace round.
Add 7 cm flare to hem of centre front and centre back seams, 10 cm flare to hem of side seam.

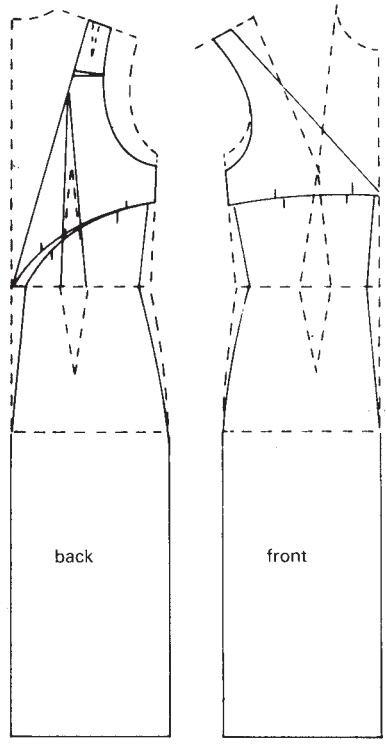
4 Camisole top

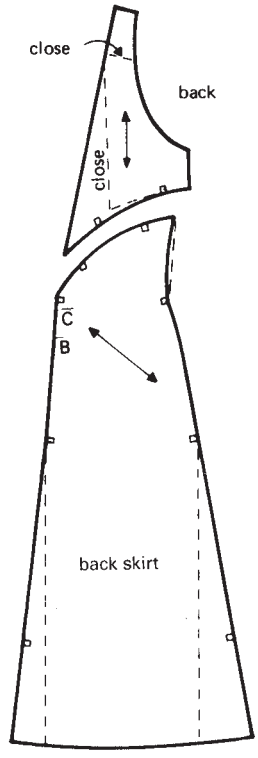


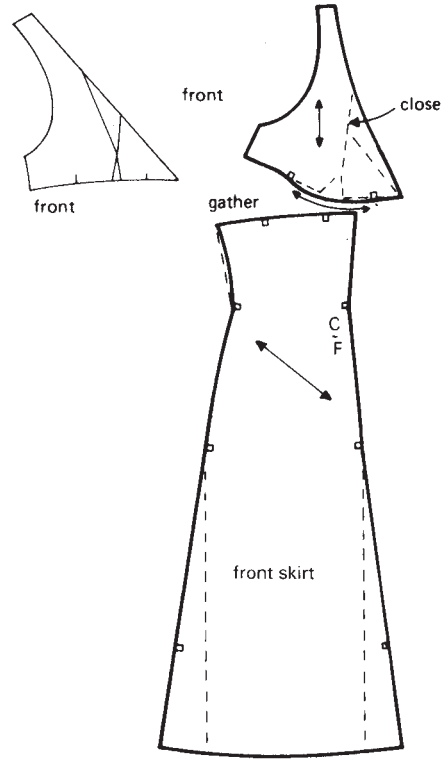


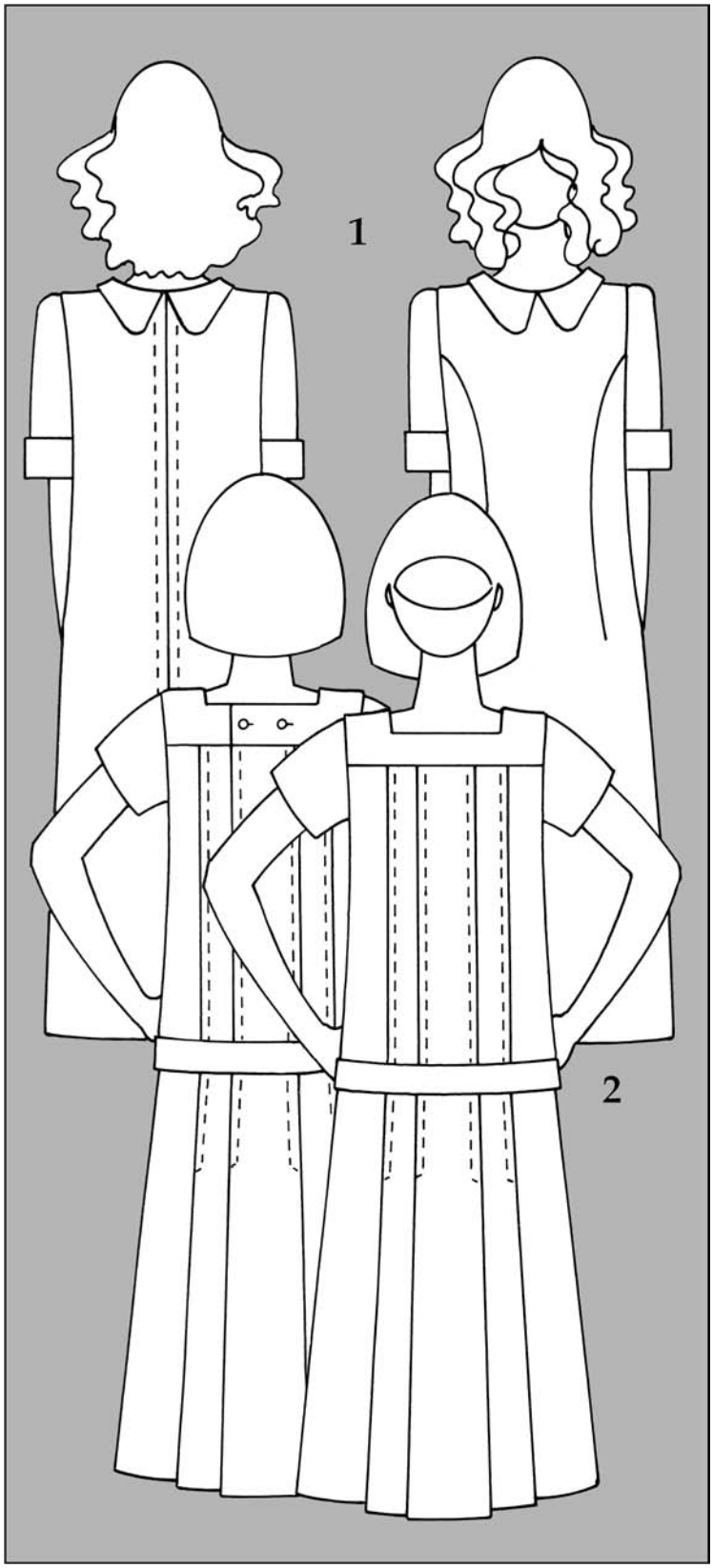


5 'V' neck









Dresses and 'dressmaker' jackets

Many styles are based on the shift dress, and the fit depends on whether a close fitting or easy fitting block is chosen for the adaptation. Shaping at the waistline can be varied.

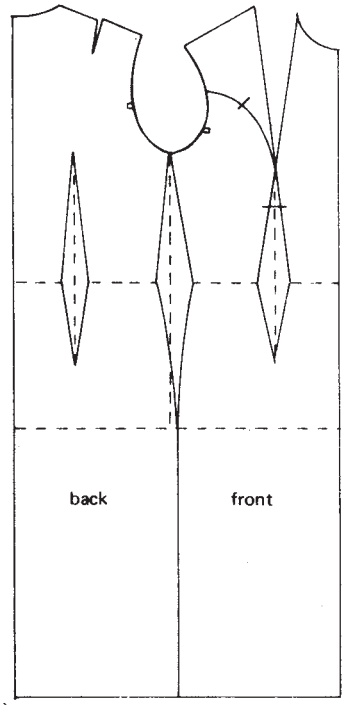
1 Basic shift dress

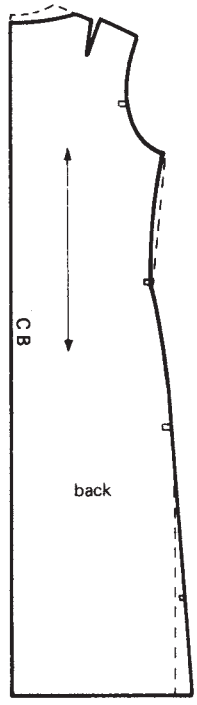
Trace round one-piece dress block.
Draw in curved line from armscye to front dart.
Cut up side seam, cut out block.
Front Cut up curved line, close bust dart, trace round. Lower neckline. Shape side seam and top of dart.
Add 3 cm flare to hem at side seam.
Back Rub out back waist dart. Lower neckline. Shape side seam.
Add 3 cm flare to hem at side seam.
Collar Diagram shows two-piece flat collar (ref. 1 page 70).
Sleeve Design shows lengthened short sleeve (ref. 6 page 50) and straight cuff with facing (page 68).

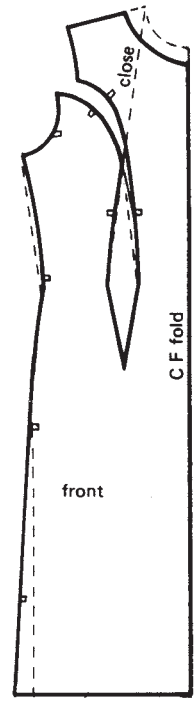
2 Styled shift dress

Trace round easy fitting dress block without waist shaping. Cut up side seam, transfer bust dart to underarm.
Back and front sections Draw in square neckline, yoke lines and low waistband.
Drop parallel pleat lines from back and front yokes.
Mark points 1 and 2 on back yoke line.
Back bodice Trace off back bodice, cut up pleat lines, open approx. 5 cm; mark fold line down centre of pleats.
Back yoke Trace off back yoke; mark point 3 at centre back, 3–4 is the measurement 1–2 on back yoke line. Mark buttonhole positions.
Front bodice Trace off front bodice, cut up pleat lines, open approx. 5 cm; mark fold line down centre of pleats. Close bust dart (the dart then becomes a part of outer pleat).
Front yoke Trace off front yoke.
Back and front skirts Trace off skirt sections; cut up pleat lines and open approx. 8 cm. Mark fold line down centre of each pleat.
Low waistband Trace off back and front waistbands, join at side seam.
Sleeve Short sleeve (ref. 6 page 50).
Note The yokes are self faced.

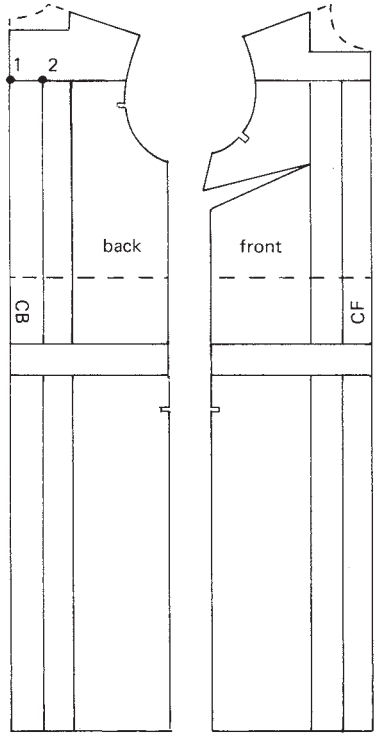
1 Basic shift dress

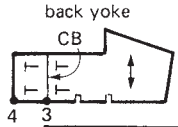


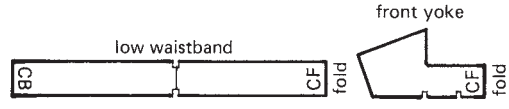


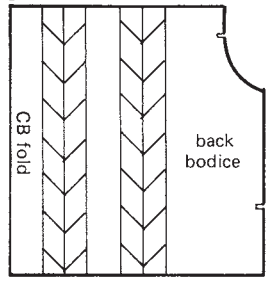


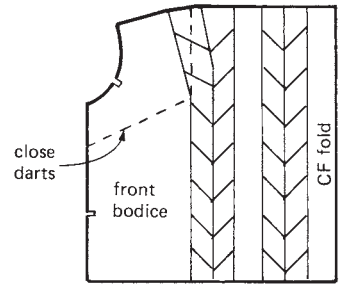
2 Styled shift dress

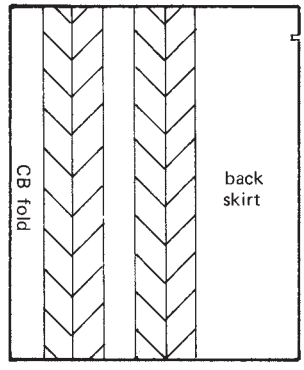


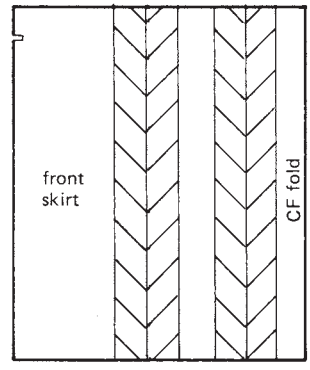


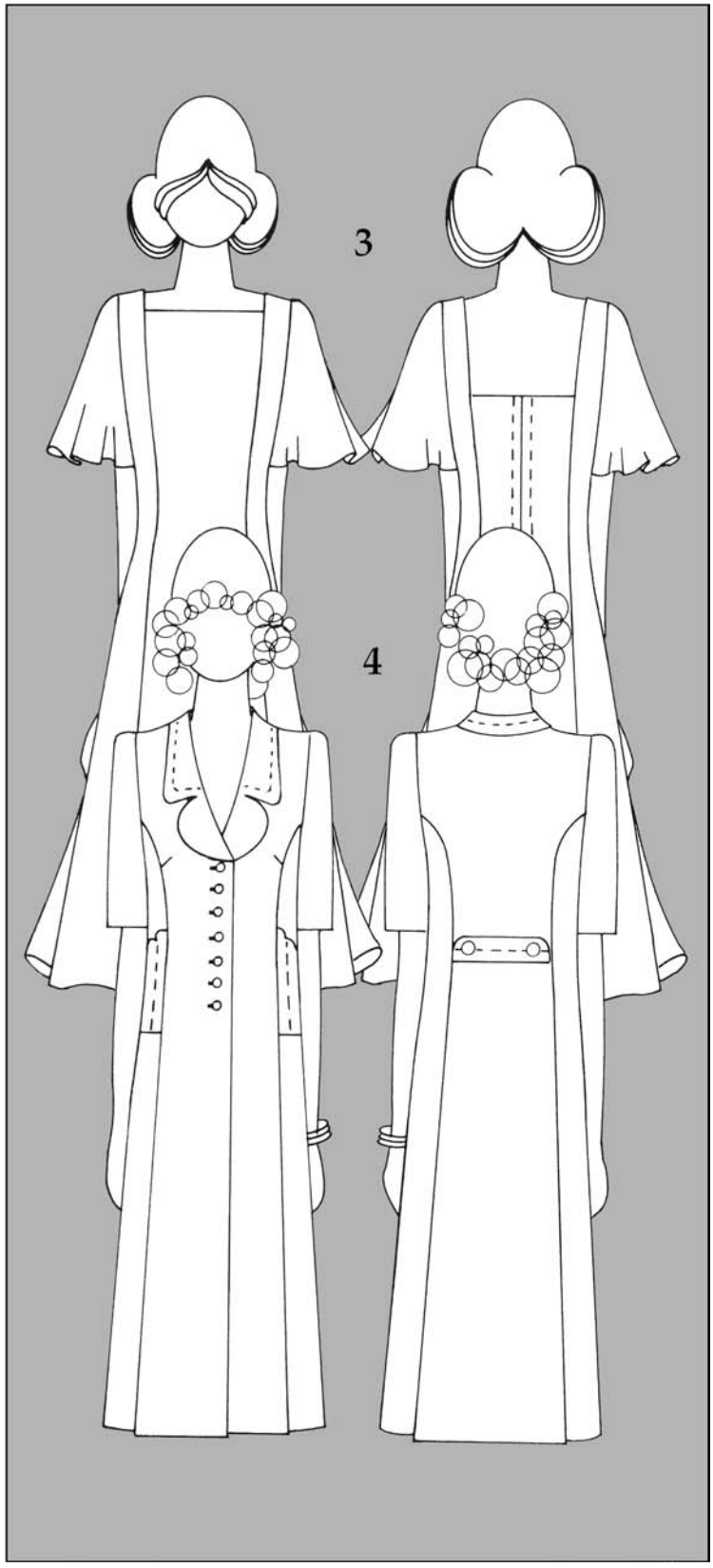












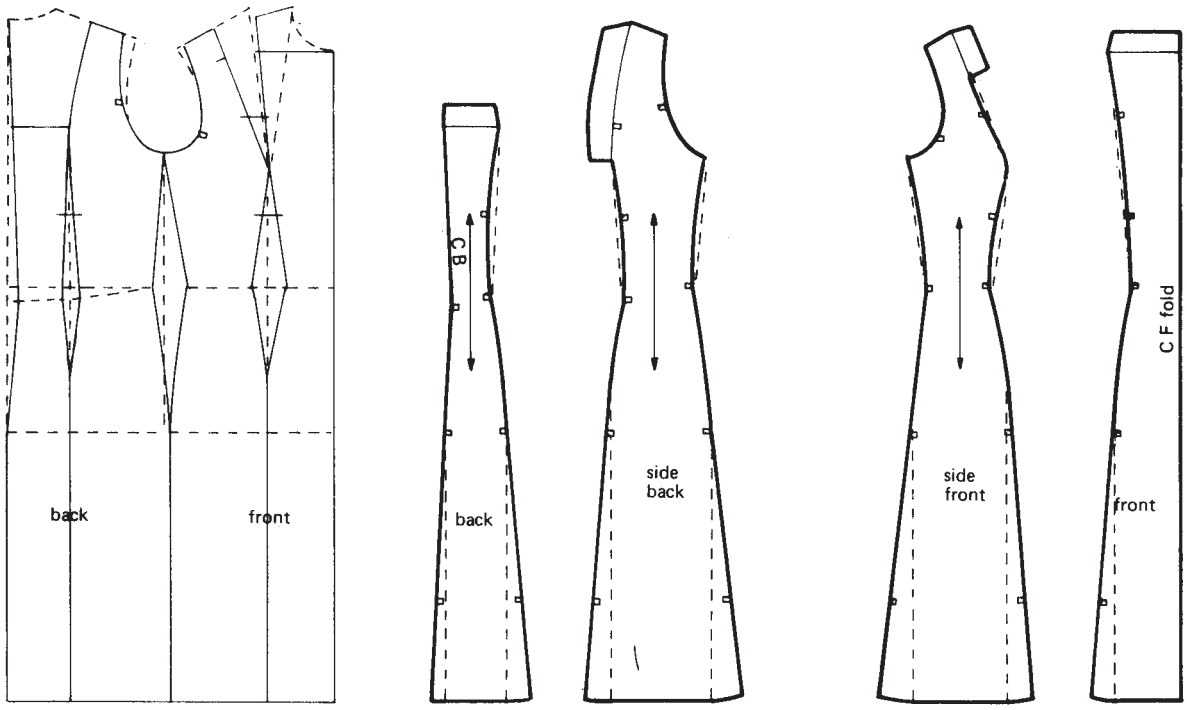
3 *Princess line*

Trace round one-piece close fitting dress block. Take 2 cm off back shoulder (this includes dart allowance) and 1 cm off front shoulder.
Transfer bust dart to centre shoulder, draw in front and back neckline.
Lower back waist point 3 cm, shape in 1.5 cm. Reduce back dart 1.5 cm.
Drop panel lines from base of front and back waist darts.
Cut out block, cut up side seams.
Front and back Cut up panel lines, trace round panels, shape seams, add 3.5 cm flare to hem of panel seams, 5 cm flare to hem of side seams and 2 cm flare to hem of back seam.
Add extended facings to top of front and back panel seams and to neck edge of side panel seams.
Sleeve Design shows very flared sleeve (ref. 10 page 52).

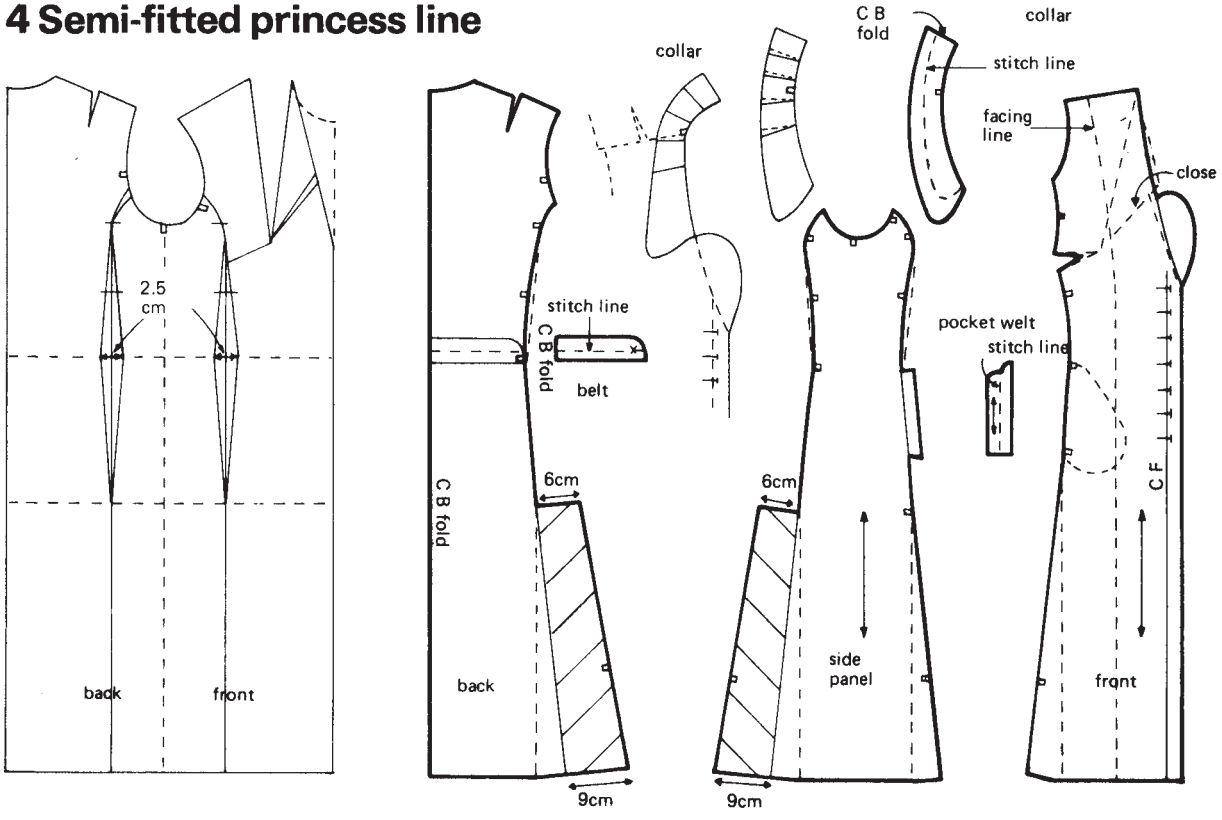
4 *Semi-fitted princess line*

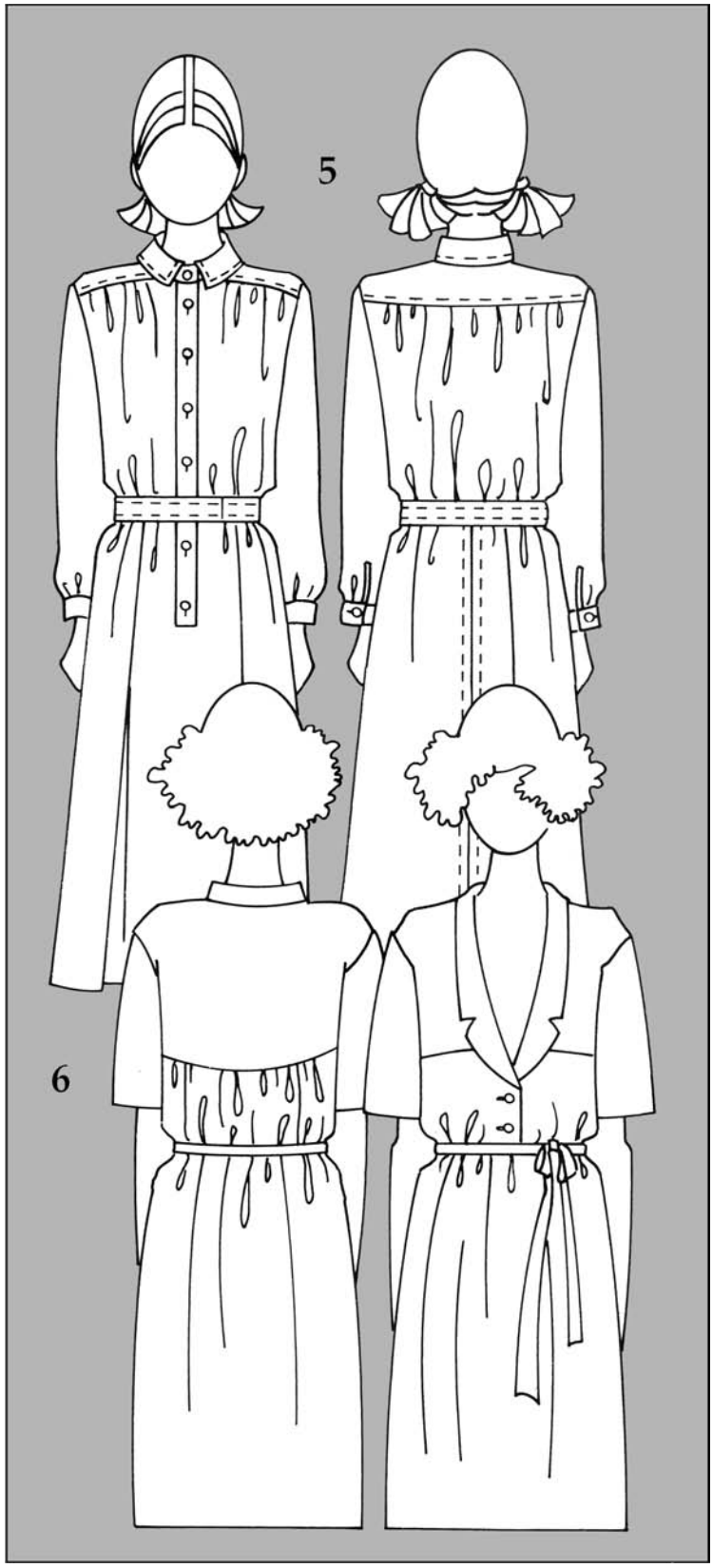
Trace round one-piece dress block.
Rub out side seam and waist darts.
Mark balance points at underarm.
Draw in side panels and shape waist 2.5 cm on each panel. Draw in neckline, take a 0.6 cm dart from front neckline. Draw a line from side panel to bust point.
Cut out block and up panel seams.
Front Close bust and neck darts, trace round.
Mark buttonholes, add buttonstand, small rever.
Add 3 cm flare to side panel seam.
Shape panel seam.
Side panel Trace round, add 3 cm flare to panel seams, add a vent pleat (6 cm at top, 9 cm at bottom) to back panel seam.
Add extension 12 cm long, 4 cm wide for pocket. Shape seams.
Back Trace round, add 3 cm flare and pleat to panel seam as for side panel. Shape seam.
Draw belt shape at top of waistline.
Belt and pocket Trace off belt shape. Draw pocket welt 12 cm long and 4 cm wide.
Collar Flat collar (ref. 3 page 70).
Sleeve Short sleeve (ref. 6 page 50).
Facing Trace a separate facing.

3 Princess line



4 Semi-fitted princess line





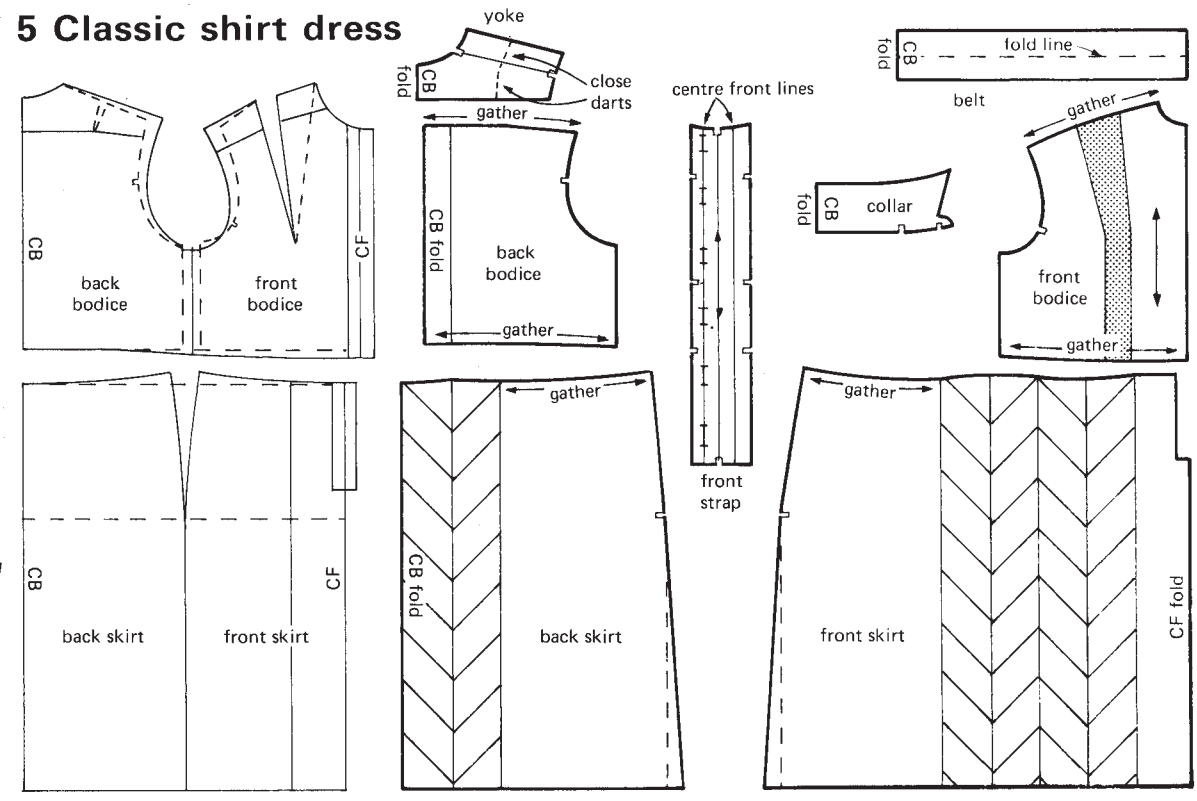
5 *Classic shirt dress*

Trace easy fitting two-piece dress block (straight side seams on bodice).
Convert 0.5 cm ease on back shoulder into a small dart.
Draw in strap line on front skirt and bodice 2 cm each side of centre line.
Draft shirt armscye (widen bodice 2 cm, lower armscye 1 cm; ref. 24 page 56).
Mark panel line on front skirt.
Yokes Draw back yoke line, slope down 0.5 cm from shoulder dart to armscye edge. Draw front yoke line.
Cut off yokes. Close shoulder darts.
Place front yoke to back yoke at shoulder line.
Trace round pattern.
Back and front bodices Trace bodices.
Cut off front strap. Square down from bust dart; cut up line, open approx. 4 cm.
Add 4 cm to centre back bodice.
Skirt Trace round skirt block.
Construct pleats (ref. 4 page 84).
Add 2.5 cm flare to side seam.
Sleeve Shirt sleeve (ref. 2 page 50).
Collar Shirt collar (ref. 9 page 72).
Front strap and belt Construct front strap, double strap width; join at waist.
Construct belt, half length and twice width required. Mark fold line at centre.

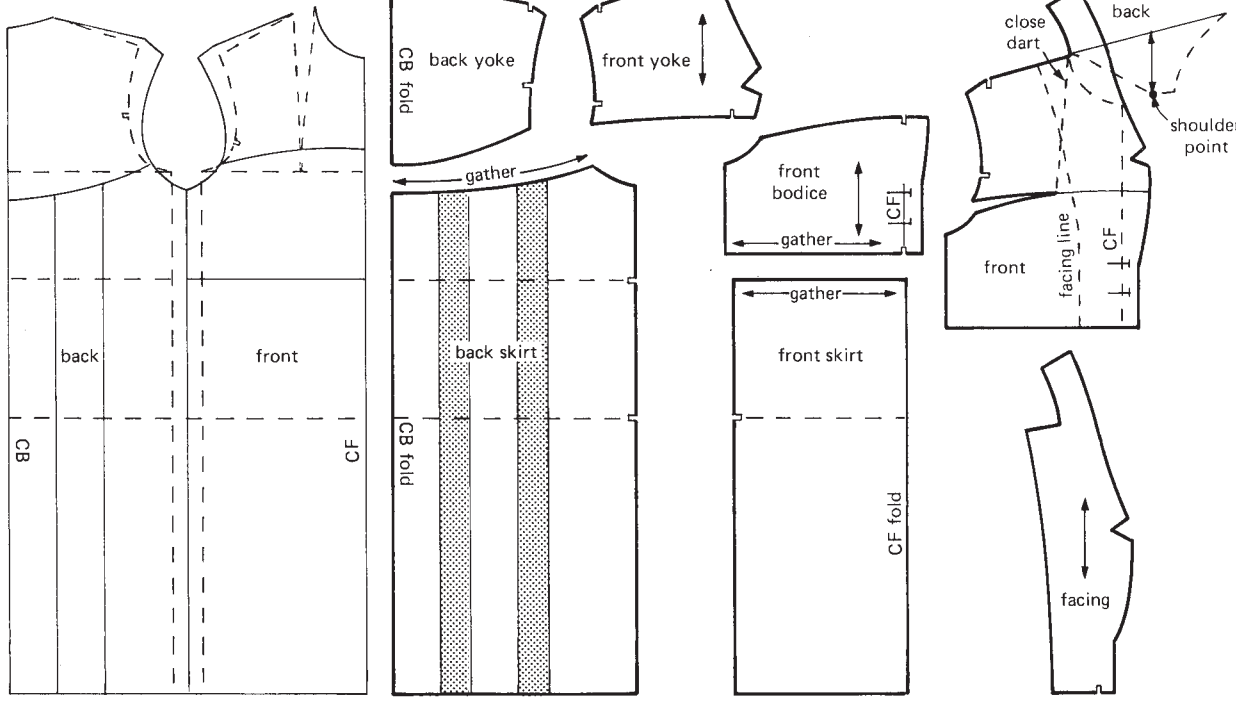
6 *Easy fitting dress*

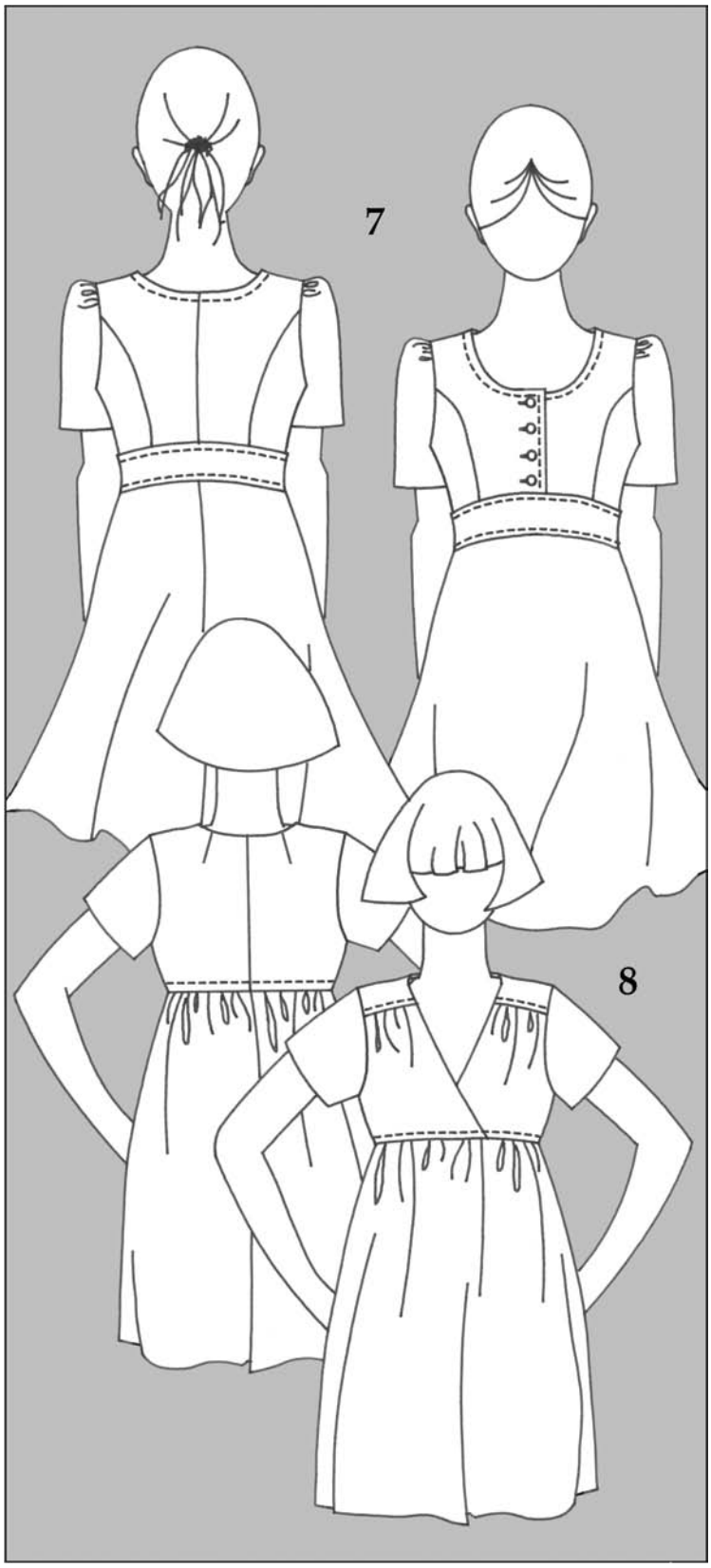
Trace easy fitting one-piece dress block and one-piece sleeve to required length.
Bodice sections Complete adaptation for dropped shoulder with lowered armscye (ref. 25 page 56).
Draw in yoke line on back and front.
Back and back yoke Divide back yoke line into three sections, square down from each point.
Trace off back yoke.
Trace off back section, cut up lines and open approx. 4 cm; redraw curve.
Front bodice Trace off front bodice.
Cut along yoke line to base of bust dart; close bust dart.
Mark buttonholes; add buttonstand.
Construct classic roll collar (ref. 12 page 74). Draw in facing line.
Trace off yoke and front bodice.
Collar facing Trace off facing.
Front skirt Trace off front skirt.
Sleeve Complete adaptation for dropped shoulder with lowered armscye.
Belt Construct belt, half length and twice width required. Mark fold line.

5 Classic shirt dress



6 Easy fitting dress





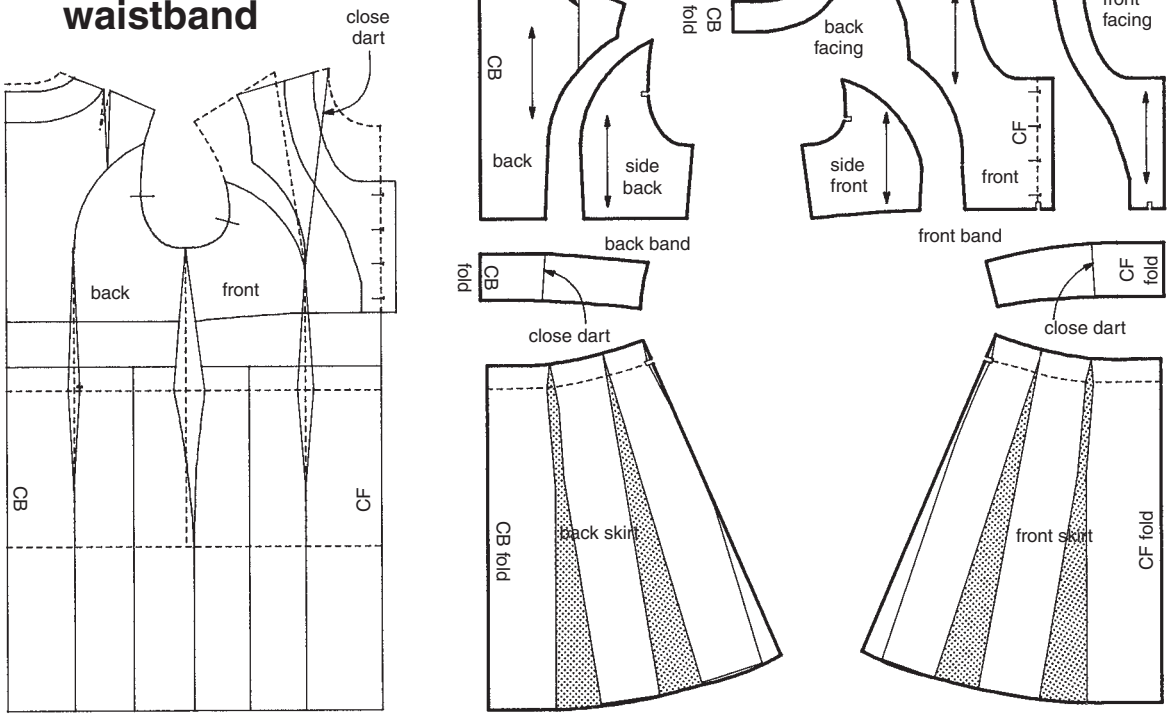
7 Dress with high waistband

Trace one-piece dress block to length required.
Draw top band line approx. 6 cm above the natural waistline; curve up 1 cm at centre front. Draw lower band line approx. 2 cm above the natural waistline.
Draw panel lines on bodices to waist darts.
Transfer bust dart to panel line armhole.
Extend back shoulder dart to panel line.
Widen neckline by 2 cm.
Draw in buttonstand; mark buttonholes.
Draw in back and front facings.
Draw vertical lines from waist darts to hem.
Divide the skirt side panels into 2 sections.
Back and front bodices Trace off bodices' facings. Close back shoulder dart.
Trace off waistbands; close darts.
Back and front skirts Trace off skirt sections, cut up section lines. Insert approx. 6 cm flare at hem, closing the waist darts.
Add 4 cm flare to side seam; join hem to waistline with a vertical line.
Sleeve Gathered head (ref. 17 page 54).

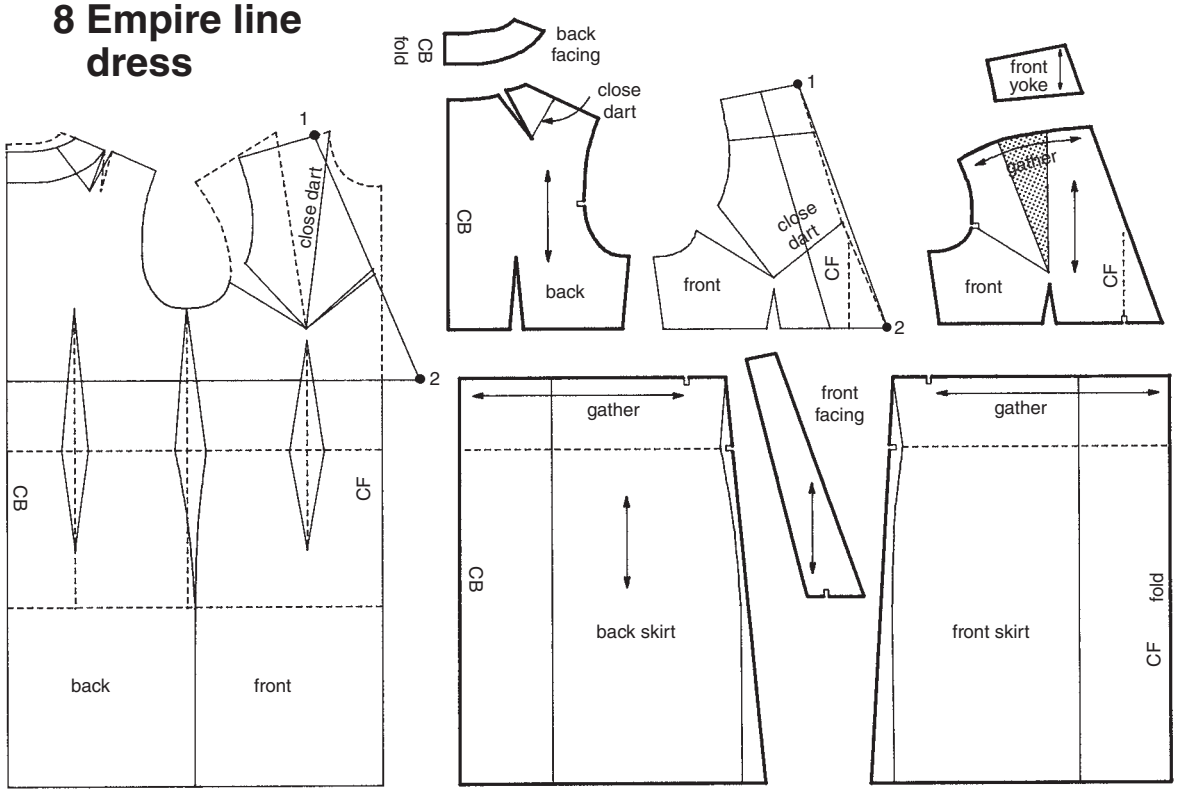
8 Empire line dress

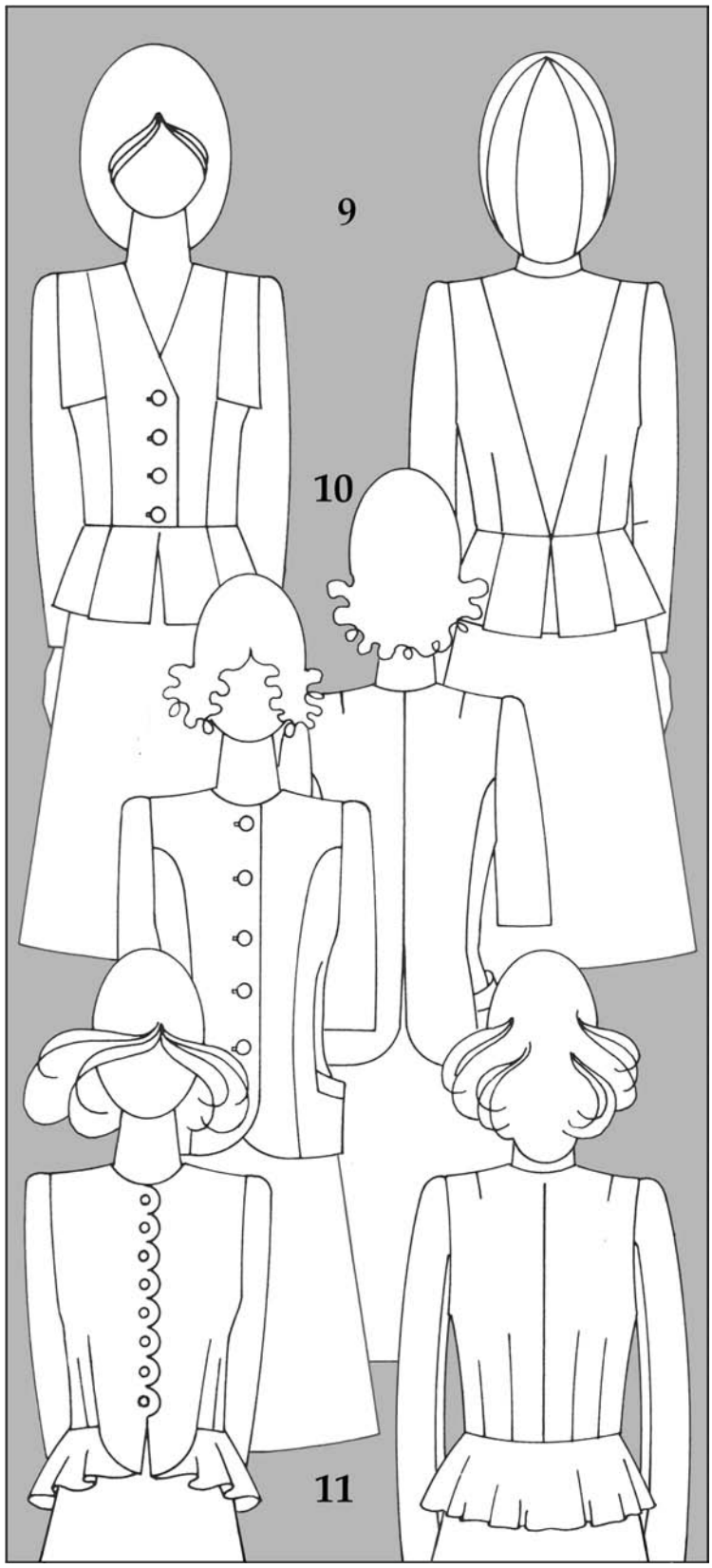
Trace one-piece dress block to length required.
Draw in high waistline approx. 6 cm above the natural waistline.
Transfer bust dart to armhole.
Widen neckline by 2 cm: mark point 1 at front shoulder point. Mark point 2, 5 cm from the centre front line. Join 1–2.
Draw a 0.5 cm dart on the neckline.
Re-draw back dart 2 cm towards centre back.
Draw a line from base of new dart to the neckline.
Draw in back facing line.
Back bodice Trace off back bodice and facing.
Transfer shoulder dart to neck line.
Front bodice Trace off front bodice**.**
Close neckline dart and re-draw 1–2 with a straight line.
Draw in front yoke line and facing line.
Trace off front bodice, yoke and facing.
On front bodice, transfer bust dart to yoke line and mark as gathers.
Back and front skirts Trace off skirt sections along new high waistline.
Extend the centre front and back lines 10 cm.
Rub out darts.
Add 5 cm flare to hemline; draw a straight line from waist to hemline.
Sleeve Short sleeve (ref. 6 page 50).

7 Dress with high waistband



8 Empire line dress





For 'dressmaker' jackets use a dress block constructed from the close fitting or easy fitting bodice blocks.

9 Jacket – pleated peplum

Trace dress block with waist shaping to length required. Hollow centre back waist 1 cm; drop front waistline 1 cm. Draw in panel seams and collar. Close bust dart. Draw in neckline. Cut along waist seam, panel, side seams.
Trace round sections and collar.
Shape seams; mark buttonholes and buttonstand.
Cut facing as front.
Peplum Cut up centre of side panels; open 2 cm for flare. Add 4 cm vent pleats to panel lines and 8 cm at centre back for inverted pleat. Trace round, fold pleats, cut out. Add extended facing to centre front.

10 Basic fitted jacket

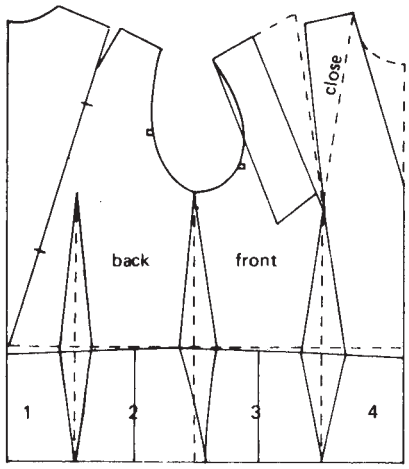
Trace dress block without waist shaping to length required. Lower back waist 2.5 cm, shape in 1 cm. Draw in panel lines as shown, draw in required waist shaping on these lines and a small dart midway between side seam and front panel.

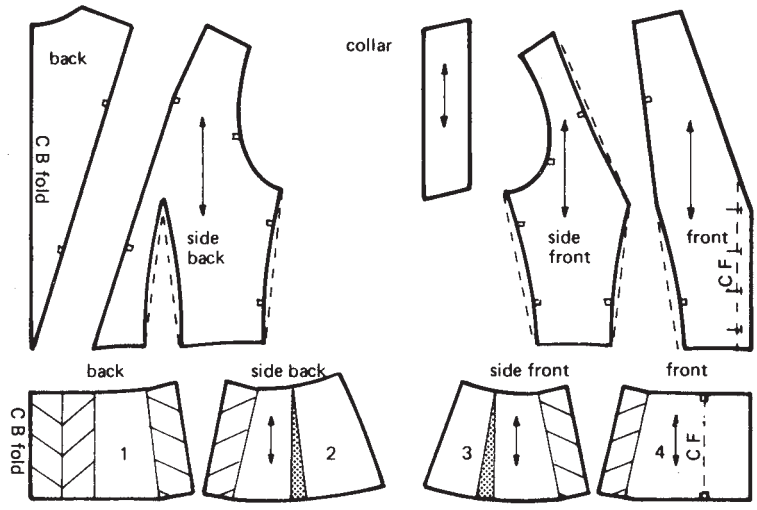
Draw in pocket and welt from small dart to back panel line.
Trace off pocket welt and bag.
Cut up panels.
Back Trace round, shape seams.
Side panel Trace round, shape seams. Extend side seam at top of pocket the same measurements as width of dart.
Cut along lines 1 and 2.
Front Close bust dart, trace round, shape panel seam, mark buttonholes, add buttonstand. Cut facing as front.

11 Jacket – flared peplum

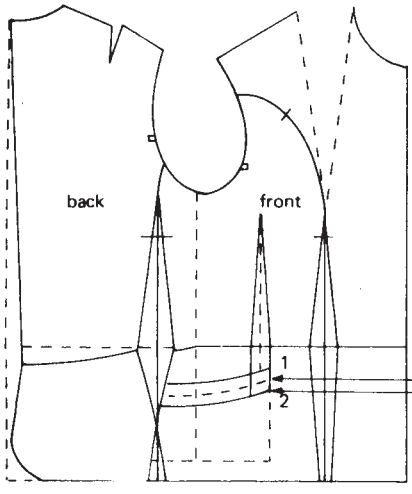
Trace dress block without waist shaping to length required. Draw shaped peplum line. Draw in two darts at back and front as shown. Cut up side seam, and along peplum line.
Back Trace round, shape seams, darts.
Front Close bust dart, trace round. Shape seams, shorten darts.
Add scalloped buttonstand, mark buttonholes.
Trace separate facing.
Peplums Close darts along waistline and open out hem to give required amount of flare. Trace round pattern.

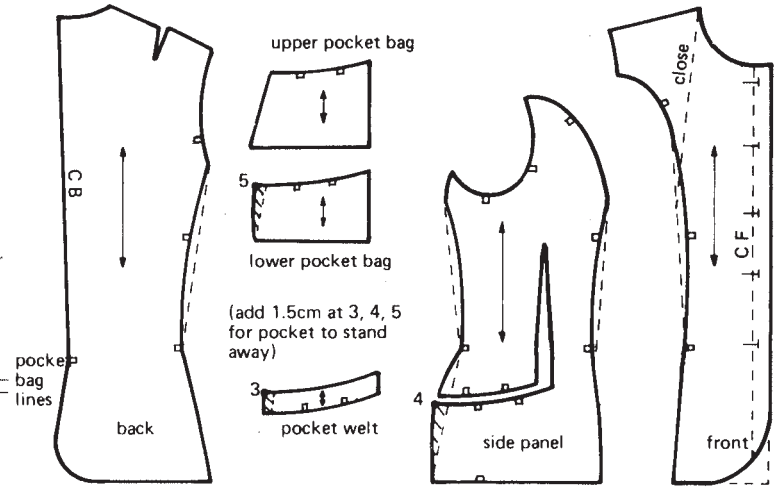
9 Pleated peplum



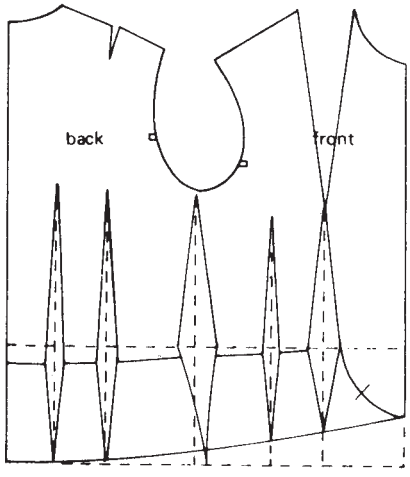


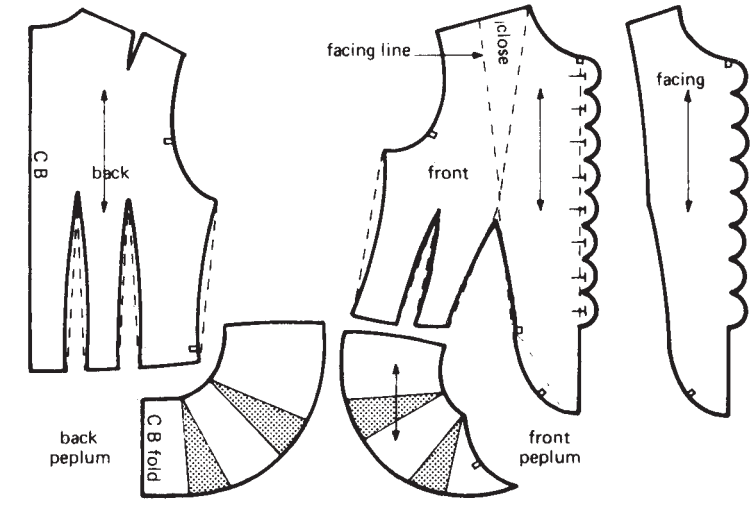
10 Basic fitted jacket

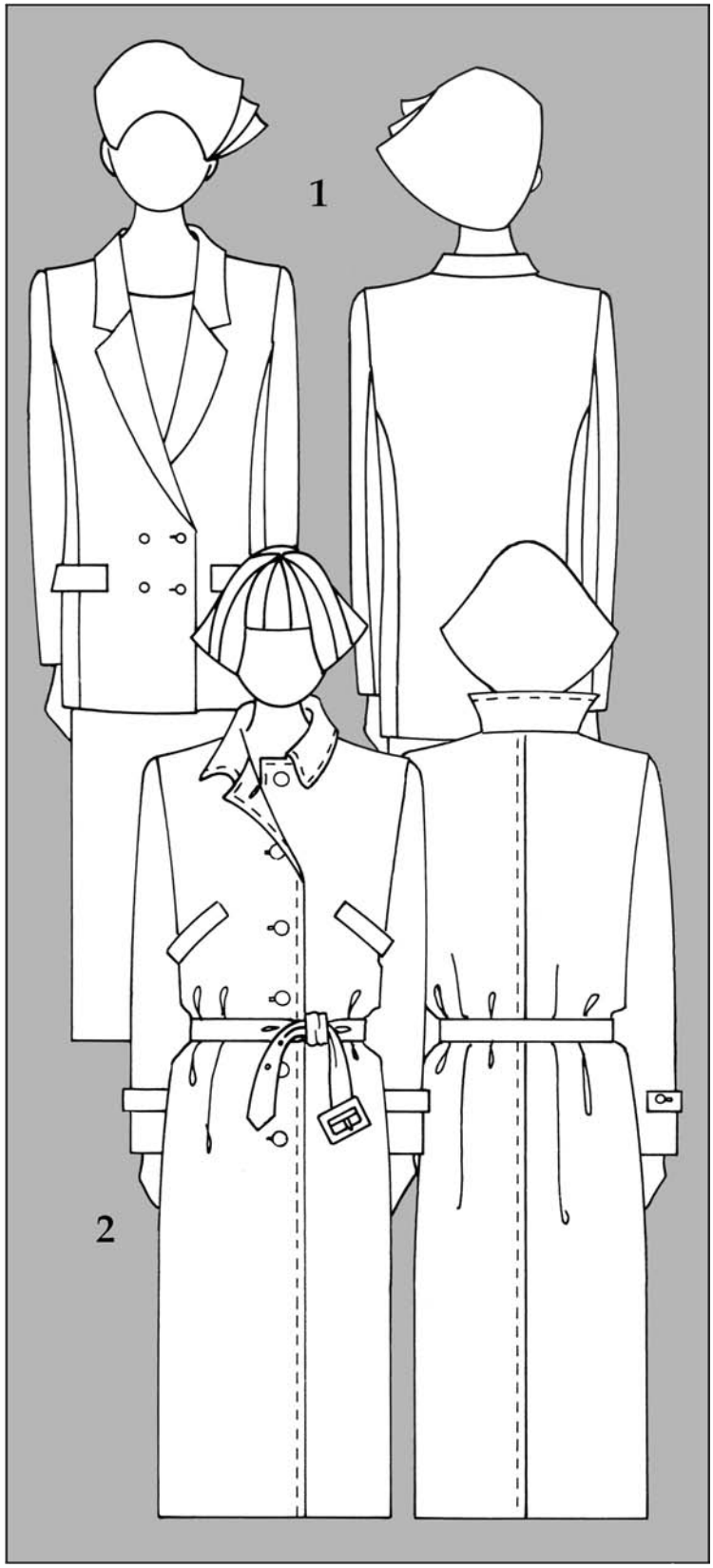




11 Flared peplum







Jackets and coats

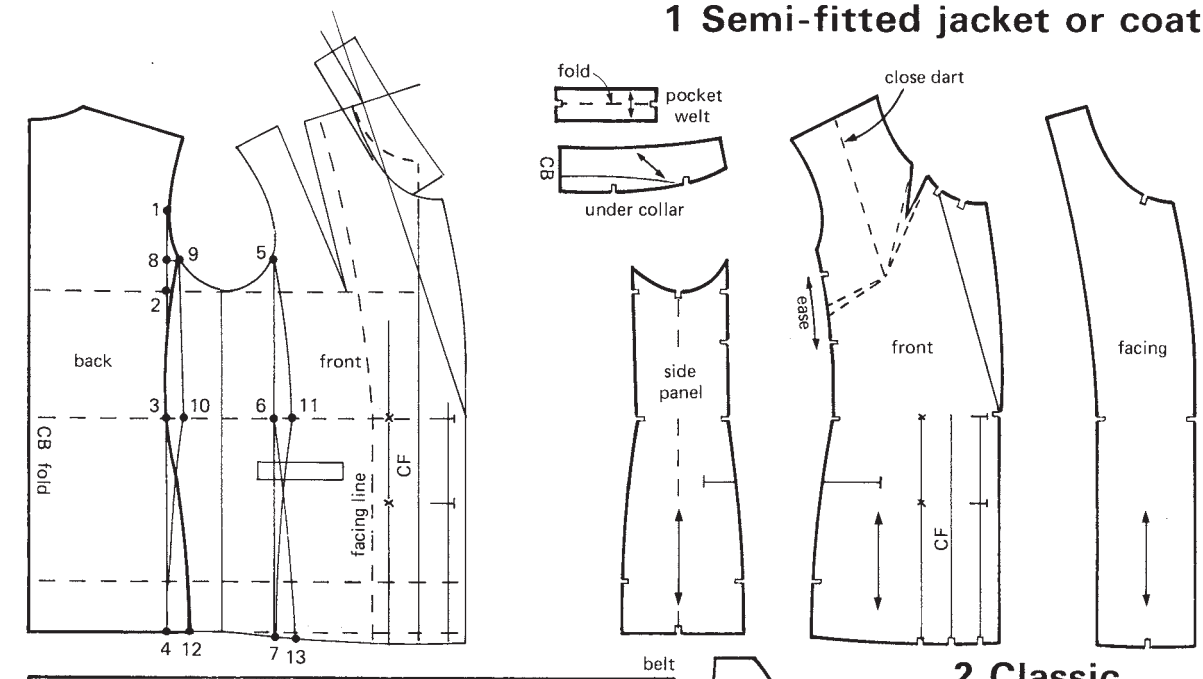
1 Semi-fitted jacket or coat

Trace jacket or overgarment block depending on fit of garment required. Draft block with reduced bust dart; transfer dart to centre shoulder.
Body sections Drop vertical lines from back and front pitch points. Mark 1, 2, 3, 4 on back; 5, 6, 7 on front; 8 is midway 1–2; square across to 9.
3–10 and 6–11 1.5 cm.
4–12 and 7–13 2 cm.
Draw back seam lines 9, 3, 12; 9, 10, 4.
Draw front seam lines 5, 6, 13; 5, 11, 7.
Draw in welt pocket.
Mark buttonholes, add buttonstand for double breasted front (ref. 3 page 40).
Lower neckline and draw in required rever shape. Construct standard collar and rever (ref. 19 page 76) on new neckline. Draw in facing line.
Back Trace off back.
Side panel Trace off side panel.
Front Trace front section; transfer 1 cm of bust dart to panel line (use as ease); the remainder to a dart in the neckline.
Collar and facing Trace off collar and facing.
Sleeve Two-piece sleeve (page 26).
Pocket Trace off pocket welt, double the width, mark fold line down centre.

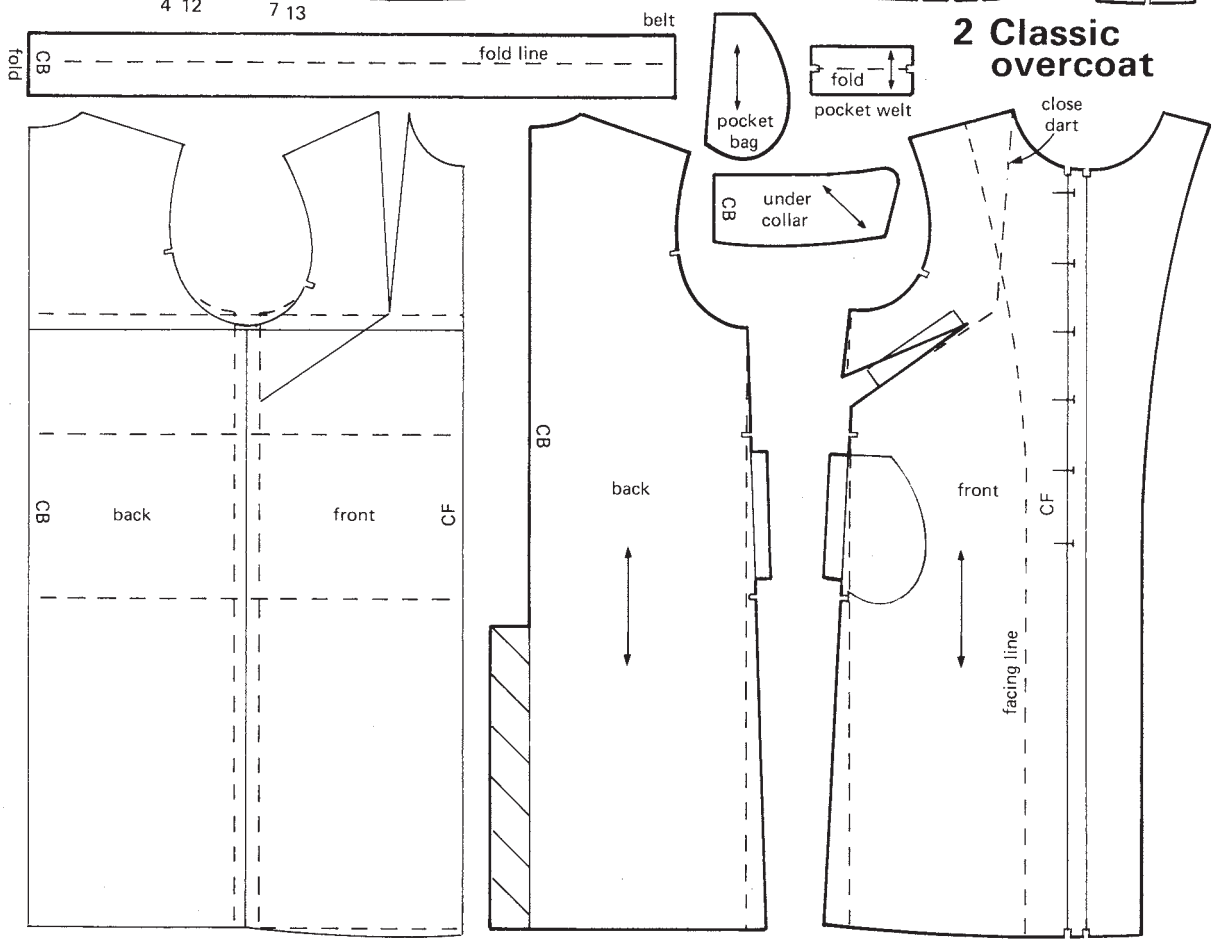
2 Classic overcoat

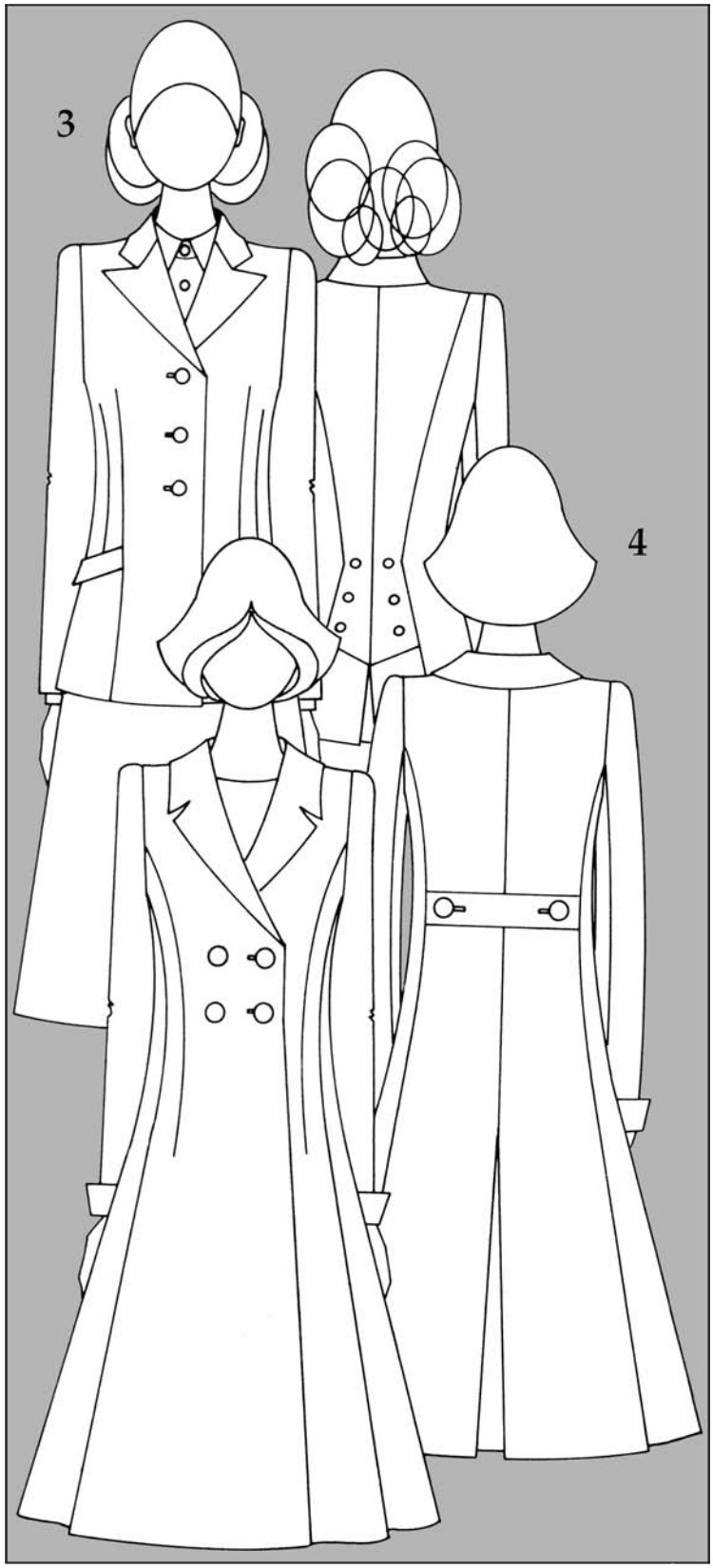
Trace overgarment block with reduced bust dart (example is half dart size). If extra ease is required in body, draft lowered armscye (ref. 23 page 56).
Back Trace off back section. Add 6 cm for vent at centre back. Add 2 cm flare and pocket facings to side seam.
Front Transfer bust dart to side seam. Draw in welt pocket if required. Lower front hemline 1 cm; join to side seam.
Mark buttonholes, add buttonstand. Draw facing line, add extended facing. Add 2 cm flare and pocket facings to side seam.
Draw pocket bag, trace off.
Sleeve Trace one-piece sleeve, complete lowered armscye if required.
Collar Construct convertible collar (ref. 8 page 72).
Belt Belt length is half waist measurement plus 25 cm and twice width required. Mark fold at centre.
Straps and pocket welt Draft length required and twice width. Mark fold.

1 Semi-fitted jacket or coat



2 Classic overcoat





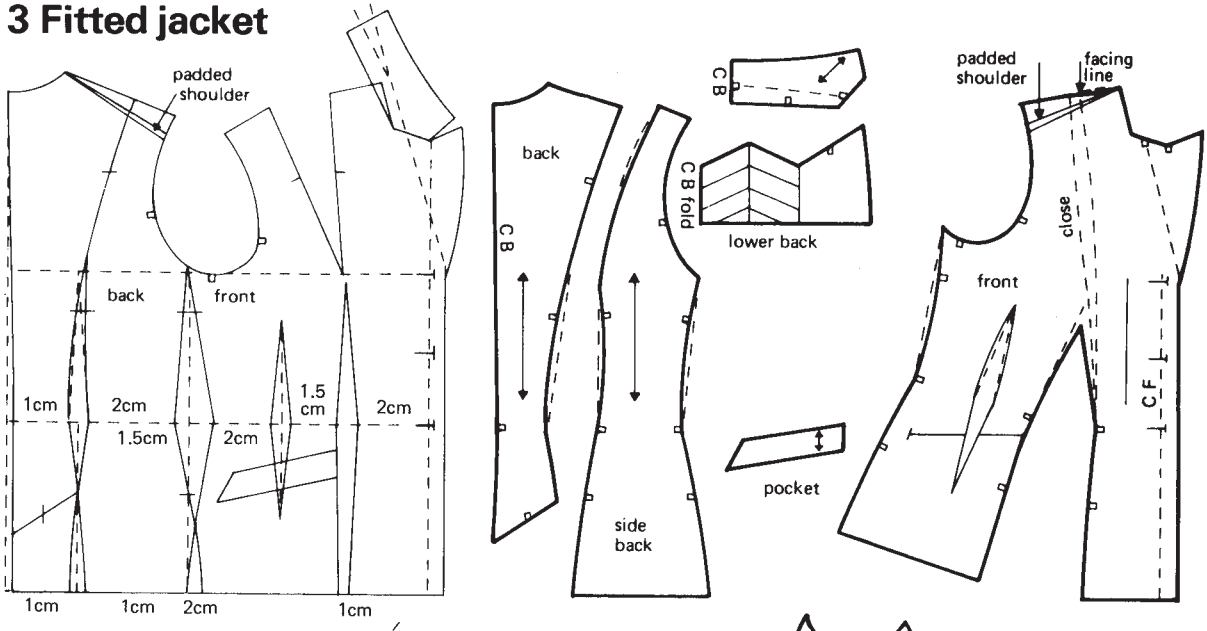
3 Fitted jacket

Trace off tailored jacket block to length required. Draw in back panel lines, remark side seam 2.5 cm towards back.
Shape waist and side seam as shown.
Divide front dart allowance into two darts.
Add 1 cm flare to hem of back panel seam. Draw in pocket.
Mark buttonholes, add buttonstand, construct a standard reefer collar and rever (ref. 18 page 76).
Trace off all sections.
Close bust dart, shape darts and panel seams.
Wheel off a front facing.
Add 12 cm to centre back of lower back panel for an inverted pleat.
Sleeve Draft two-piece sleeve.

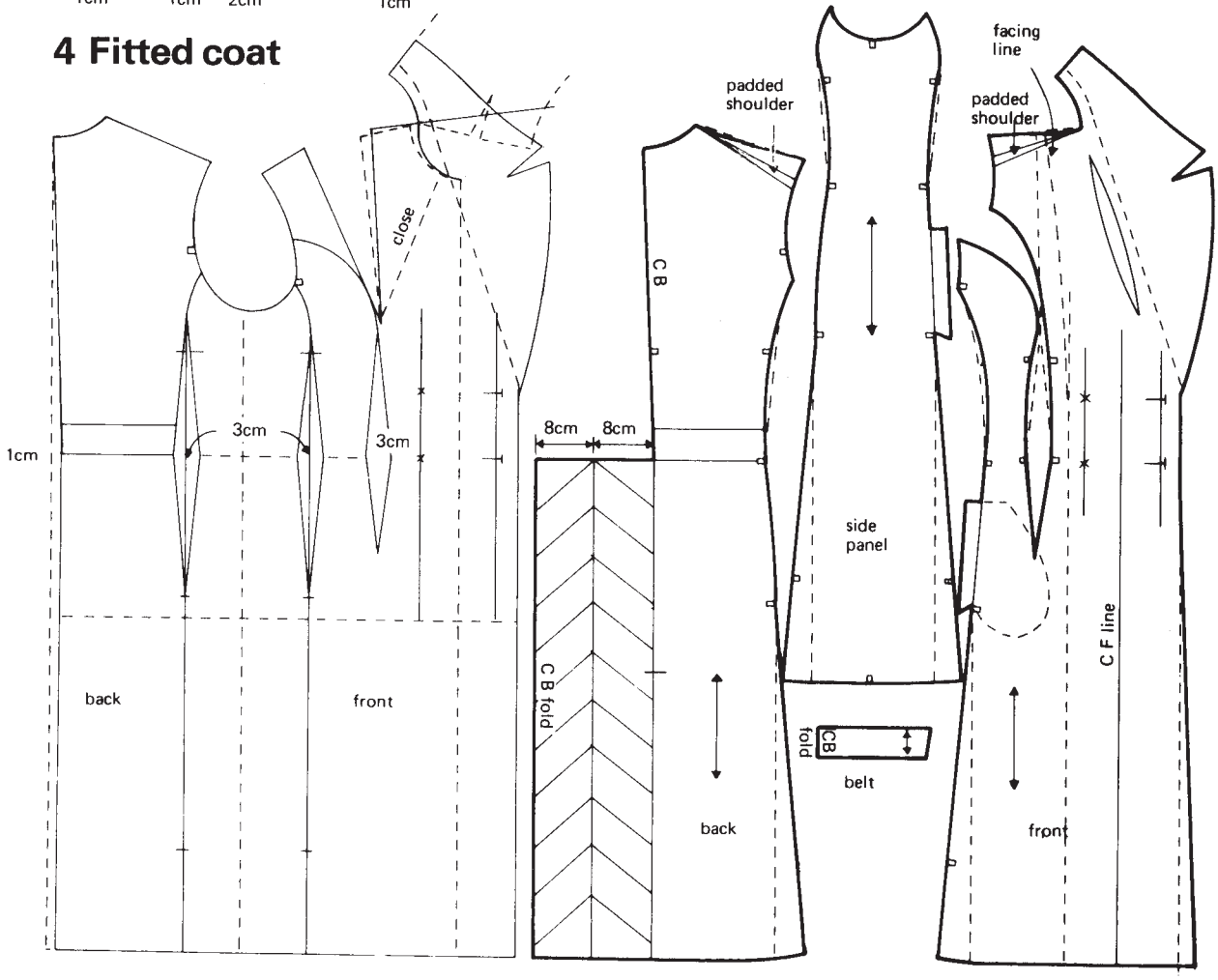
4 Fitted coat (slightly high waist)

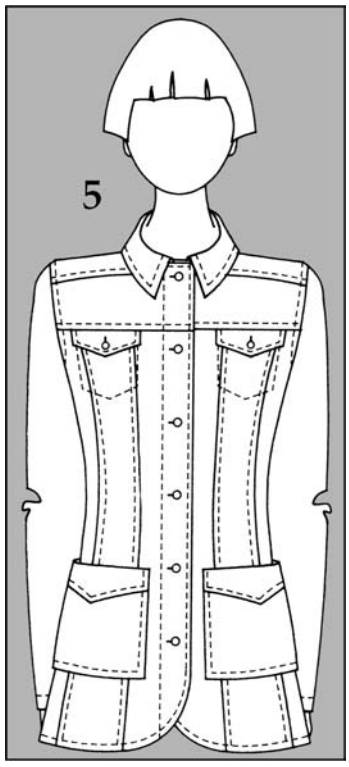
Trace round overgarment block to the length required. (The tailored jacket block can be used for a close fit.)
Mark in straight waistline. Extend to required length. Draw in panel seams.
Shape in centre back seam 1 cm at waist and hem. Shape in approx. 3 cm at front waist dart and panel seams.
Draw in belt shape.
For low rever draw in 0.6 cm dart at neckline. Close.
Draw in button lines, mark buttonholes, add buttonstand.
Construct a roll collar with a hollowed neck (ref. 16 page 74), swing back 5 cm. Draw in notch.
Trace off all sections.
Back Add 16 cm to centre back skirt for an inverted pleat. Shape panel seam, add 4 cm flare to hem.
Front and side panel Shape panel seams, add 5 cm flare at hem.
Add 2.5 cm flare at front edge.
Add pocket facing to front seam.
Close bust dart.
Trace off front facing.
Sleeve Draft two-piece sleeve (page 26). Construct shaped cuff (page 68).
Note For padded shoulders raise shoulders and sleeve heads (ref. 8 page 50).

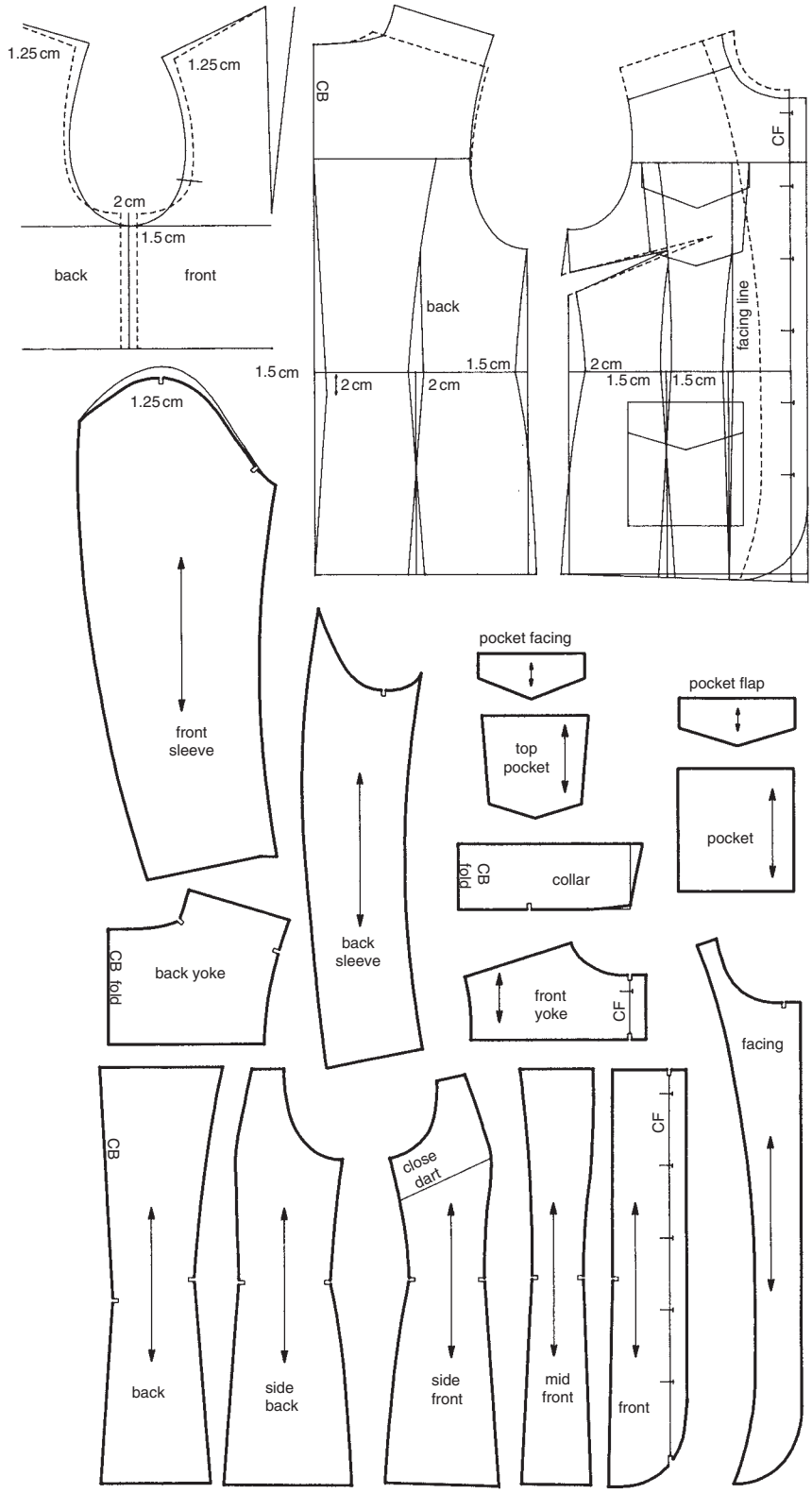
3 Fitted jacket



4 Fitted coat







5 *Fitted casual jacket*

Trace the easy fitting bodice block. Use the two-piece sleeve block (page 26). For an easier fit, modify the sleeve and the shirt armscye adaptation (ref. 24 page 56).

Separate front section. Transfer dart to underarm.

Extend block to length required. Widen neck 1.5 cm, lower front neck 1 cm. Take 4 cm off front shoulder, add to back shoulder. Redraw armscye. Draw in yoke and panel lines. Draw in waist shaping as required or example. Shorten dart to side panel line. Square down from the centre of each darting at the waist to hemline.

Add 1 cm flare to side seams and to the panels where indicated.

Front Add buttonstand, mark buttonholes and facing line. Lower hemline at front 1 cm. Draw in pockets. Trace yoke, panels and pockets. Close dart on side front.

Back Trace yoke and panels.

Collar and facing Trace off facing. Construct a convertible collar (ref. 8 page 72).

Classic coat and jacket hems and seam allowances

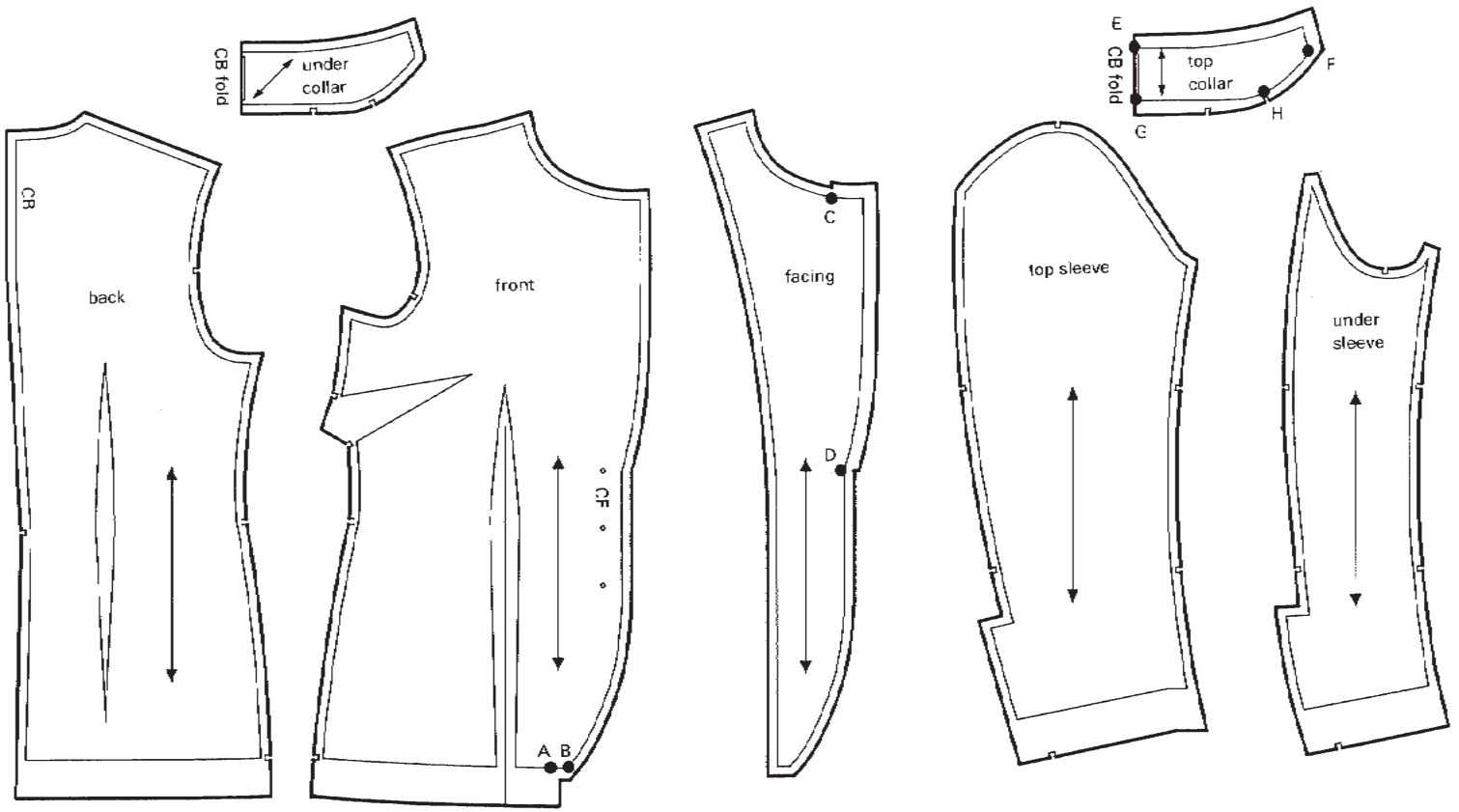
Seam allowances will vary with the style and the fabric; the example shows seam allowances on a basic jacket pattern.

Back and front Mark point A at facing line point on the front hemline. A–B = 1 cm.
Add 1 cm seam to all seam edges.
Add 1 cm to the hem from point B to the front edge.
Add 4 cm hem allowance. Make a step at point B.

Facing Mark point C at the collar point and point D at the break line.
Add 1 cm to all seam edges from C–D.
Add extra allowance to the outer edge of facing from C–D. (The amount will vary depending on the thickness of the fabric.)

Collars The seam allowance for collars will vary with the type of manufacture or make-up (i.e. shaping of the under collar). Note that the top collar is cut with extra ease (ref. page 70).
For standard styles add extra ease (approx. 0.5 cm) to the collar style line from E–F and to the neck edge from G–H.

Sleeve Add vents to back seam 10 cm long and 2 cm wide. Add 1 cm seam allowance to all seam lines. Add 4.5 cm hem allowance.



Classic coat and jacket linings

Ease allowance is required in linings for two reasons:

(1) Cloth garments, particularly those made in woollen fabrics, 'spread' a little when they are cut out. Lining fabrics do not relax in the same manner. The amount of ease required is dependent on the fabric used; the example shown is a general guide.

(2) The linings should be loose enough to prevent the garment being distorted when the lining is inserted. The ease in the lining also allows for parts of the garment that come under stress from body movement. Particular stress points are the armscye and the centre back.

The lining patterns are made after seam allowance has been added to the garment piece patterns.

Body and sleeve linings are cut 2 cm above cloth hemlines.

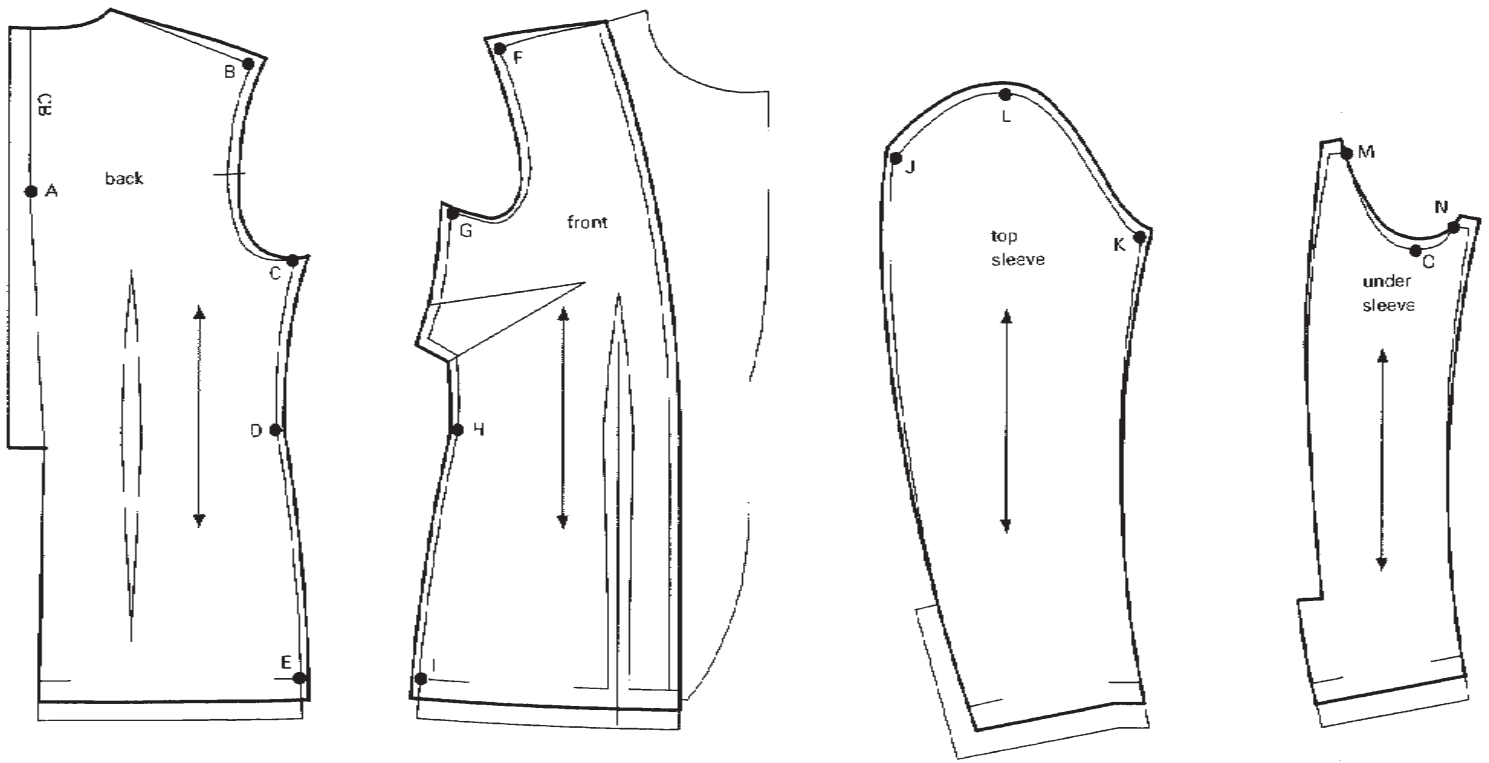
Back Add 2 cm at A for the centre back pleat. Add 1 cm out and up at B; 1 cm out and 0.5 cm up at C; 0.5 cm out at D and E.

Front Add 1 cm out and up at F; 1 cm out and 0.5 cm up at G; 0.5 cm out at H and I. Add 1 cm to the facing line for seam allowance.

Top sleeve Add 1 cm up and 0.8 cm out at J and K; 1 cm up at L.

Under sleeve Add 1 cm up and 0.8 cm out at M and N; 1 cm up at 0. Reshape underarm curve as shown. Add vent allowance to undersleeve.

Note In the bespoke trade, linings are often cut by laying the cloth pieces directly onto the lining fabric; in manufacture, separate lining patterns have to be made.



PART TWO: FLAT CUTTING

9 Easy fitting garments (woven fabrics)

These adaptations are all based on *flat cutting* without using dart shaping or close fitting waist shaping. The technique is useful for flat-packed garments. The basic *flat* blocks are used mainly for garments of easy fitting shape in woven fabrics and therefore have a substantial amount of ease included. They are the base for most sportswear and weatherwear garments, but they can also be used as a means to create innovative shapes.

Sleeve and collar adaptations from Part one: Form cutting can be used. Some style examples are shown to demonstrate their application. Most examples show the back and front sections facing the same way. This is used so that grading points and instructions for both patterns will be the same. *Flat cutting* enables the use of these simple grading techniques.

Easy fitting trouser and skirt shapes 132

The easy fitting trouser block 132
Ease in the back crutch 132

The simple trouser block 134

The simple and very simple skirt blocks 134
1 'Baggy' trousers 136
2 One-piece trousers 136
3 Asymmetric panelled skirt 138
4 Basic yoked skirts with panels 138

Easy fitting body shapes 140

The basic shirt block 140

The basic 'flat' overgarment blocks 142
The 'flat' kimono block 142
1 Jacket – inset sleeve 144
2 Trench coat – inset sleeve 144
3 Swing jacket/coat – kimono sleeve 146
4 Weatherwear – kimono sleeve 146

Sizing

Sportswear and some casual wear manufacturers usually use sizing breaks of XSMALL, SMALL, MEDIUM, LARGE and XLARGE. The example sizings used in the following drafts are based on size MEDIUM, High-street fashion garments (see page 12).

Easy fitting trouser and skirt shapes

The easy fitting trouser block (for 'baggy' trousers and dungarees)

Measurements required to draft the block

The block can be drafted to size codes 8, 10, 12, etc, or to XSMALL, SMALL, MEDIUM, LARGE, XLARGE from any of the size charts in this book (pages 12–14). Personal measurements (see page 178) can also be applied to the block.
A size MEDIUM from the size chart on page 12 (for fashion garments) is used for this illustrated example.

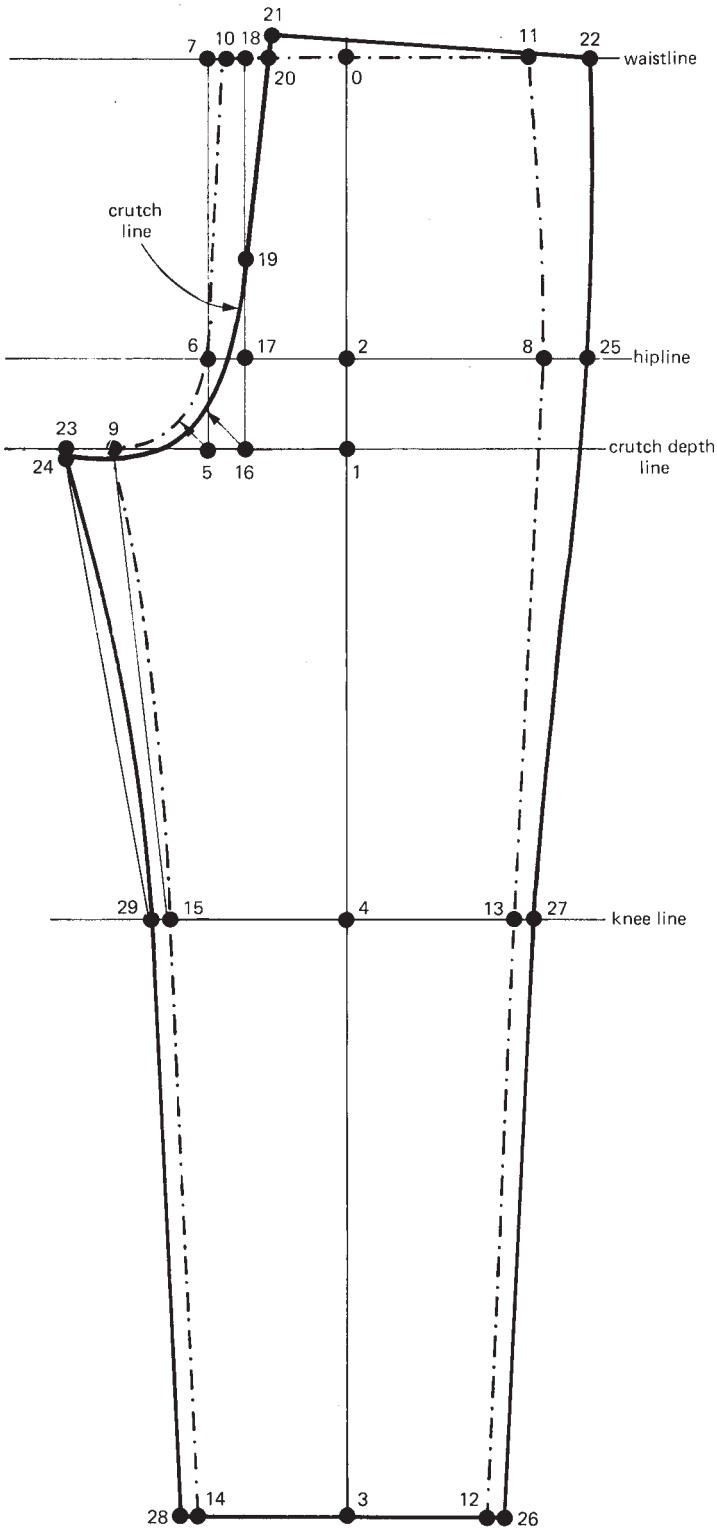
waist	68 cm	body rise	28 cm
hips	94 cm	waist to floor	104 cm
waist to hip	20.6 cm	trouser bottom width (page 13)	22 cm

Front
Square both ways from 0.
0–1 body rise plus 1 cm; square across.
0–2 waist to hip; square across.
0–3 waist to floor measurement; square across.
1–4 half the measurement 1–3 minus 5 cm; square across.
1–5 one twelfth hip measurement plus 1.8 cm; square up to 6 and 7.
6–8 quarter hip measurement plus 1 cm.
5–9 one sixteenth hip measurement plus 1 cm.
7–10 1 cm.
Join 10–6 and 6–9 with a curve touching a point:
sizes 6–14 or XSml, Sml, Med 3.5 cm from 5
sizes 16–26 or Lge, XLge 3.75 cm from 5
10–11 quarter waist plus 5 cm.
3–12 half trouser bottom width minus 0.5 cm; join 8–12. Mark point 13 on knee line.
Draw in side seam; join 8–11 with a slight curve. Join 8–13 and 13–12.
3–14 half trouser bottom width minus 0.5 cm.
4–15 the measurement 4–13.
Draw inside leg seam, join 14–15; join 9–15 curving the line inwards 0.75 cm.

Back
5–16 quarter the measurement 1–5; square up to 17 on the hipline, 18 on the waistline.
16–19 half the measurement 16–18.
18–20 2 cm.
20–21 2 cm.
21–22 quarter waist plus 6 cm; join 21–22 to touch the horizontal line from 0.
9–23 half the measurement 5–9.
23–24 0.25 cm.
Join 21–19; join 19–24 with a curve touching a point:
sizes 6–14 or XSml, Sml, Med 4.5 cm from 16
sizes 16–26 or Lge, XLge 4.75 cm from 16
17–25 quarter hip measurement plus 2 cm.
12–26 1 cm.
13–27 1 cm.
Draw in side seam; 22–25 curve outwards slightly, 25–27 curve inwards slightly, join 27–26.
14–28 1 cm.
15–29 1 cm.
Draw inside leg seam; join 28–29; join 29–24 curving the line inwards 1 cm.

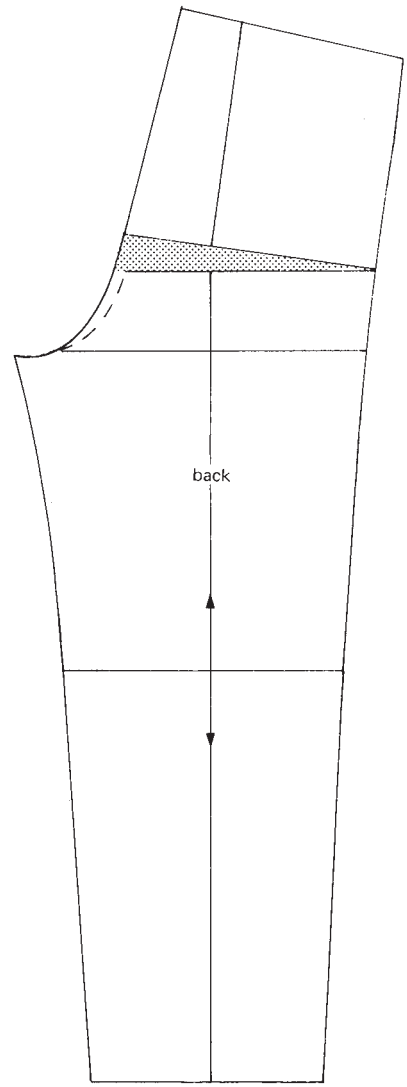
Ease in the back crutch

Most easy fitting trousers, particularly dungarees, require extra ease in the back crutch line.
Trace off back trousers of required block.
Cut along the hipline and open a wedge approx. 3.5 cm wide at back crutch line.
Redraw back crutch line as shown.



front
back

Ease in the back crutch



The simple trouser block

Measurements required to draft the blocks

The blocks can be drafted to size codes 8, 10, 12, etc, or to XSMALL, SMALL, MEDIUM, LARGE, XLARGE from any of the size charts in this book (pages 12–14). Personal measurements (see page 178) can also be applied to the blocks.
A size MEDIUM from the size chart on page 12 (for fashion garments) is used for these illustrated examples.

waist	68 cm	body rise	28 cm
low waist	80 cm	waist to floor	104 cm
hips	94 cm	high ankle	21 cm

Front
Square down and across from 0.
0–1 body rise plus 1 cm; square across.
0–2 waist to floor; square across.
1–3 half the measurement 1–2; square across.
1–4 quarter hip measurement plus 4 cm; square up to 5.
5–6 1 cm.
4–7 quarter the measurement 4–5.
4–8 quarter the measurement 1–4 minus 0.5 cm.
Join 6–7 and 7–8 with a curve touching a point:
sizes: 6–14 or XSml, Sml, Med 2.75 cm from 4
16–26 or Lge, XLge 3 cm from 4
2–9 half high ankle measurement plus 6 cm.
3–10 three quarters the measurement 1–4 plus 0.3 cm.
Draw inside leg seam; join 9–10 with a straight line, join 8–10 curving the line inwards 1 cm.

Back
5–11 3.5 cm.
11–12 3.5 cm; join 12–0.
4–13 half the measurement 4–5.
8–14 the measurement 4–8 plus 0.5 cm.
14–15 1 cm.
Join 12–13 and 13–15 with a curve touching a point:
sizes: 6–14 or XSml, Sml, Med 5 cm from 4
16–26 or Lge, XLge 5.5 cm from 4
9–16 2 cm.
10–17 3 cm.
Draw inside leg seam; join 16–17 with a straight line, join 15–17 curving the line inwards 2 cm.

Creating a one-piece pattern
Trace round back section (heavy line).
Trace round front section (dotted line).
Mirror the front and place the side seams together.

The simple and very simple skirt blocks

The simple skirt block

The block can be used for easy fitting skirts with elasticated waistbands.

Front
Square down from 0.
0–1 skirt length required; square out.
0–2 waist to hip measurement; square out.
2–3 quarter hip measurement plus 0.5 cm. Square down to 4.
0–5 quarter waist measurement plus 4 cm; square up 1.25 cm to 6. Join 0–6 with a curve.
Join 6–3. Curve the hipline out 0.25 cm.

Back
3–7 2 cm; square down to 8.
0–9 quarter waist measurement plus 6.5 cm; square up 1.25 cm to 10. Join 0–10 with a curve.
Join 10–7. Curve the hipline out 0.25 cm.

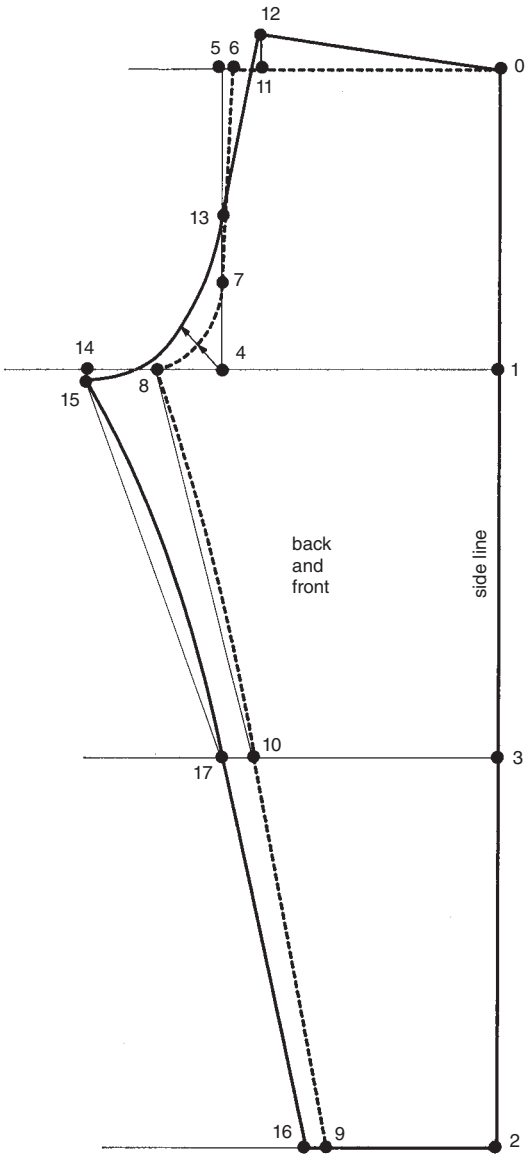
The very simple low-waist skirt block

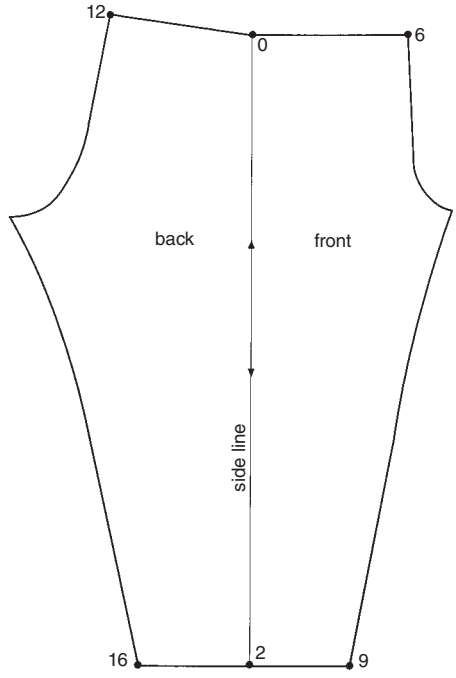
The block is useful for skirts that are cut on the cross or in stretch fabrics. The ease in the waistline can be eased into bound waistlines, or shaped or darted into faced waistlines. It can be also be used for a wide variety of skirts with yokes.

For this simple block, the diagram instructions are used for both the back and front skirts.

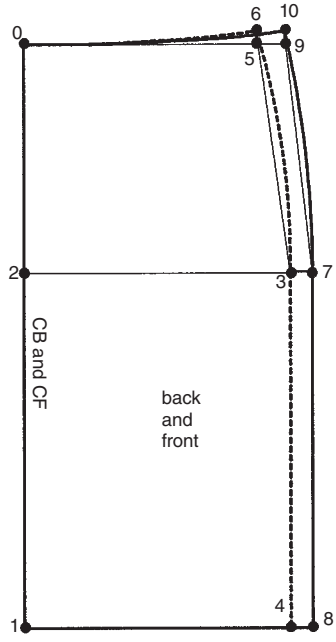
Front and back skirts
Square down from 0.
0–1 skirt length required; square out.
0–2 waist to hip measurement minus 6 cm; square out.
2–3 quarter hip measurement plus 1.5 cm. Square down to 4.
0–5 quarter low waist measurement plus 1.5 cm; square up 1.25 cm to 6. Join 0–6 with a curve.
Join 6–3. Curve the hipline out 0.2 cm.

The simple trouser block

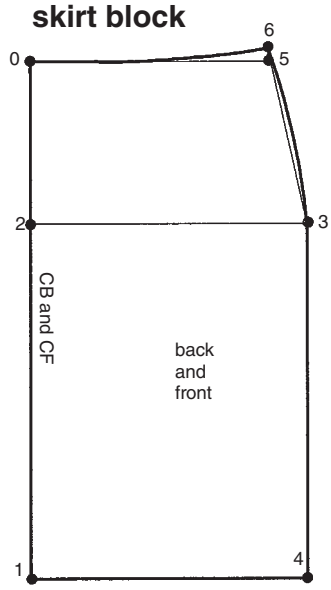


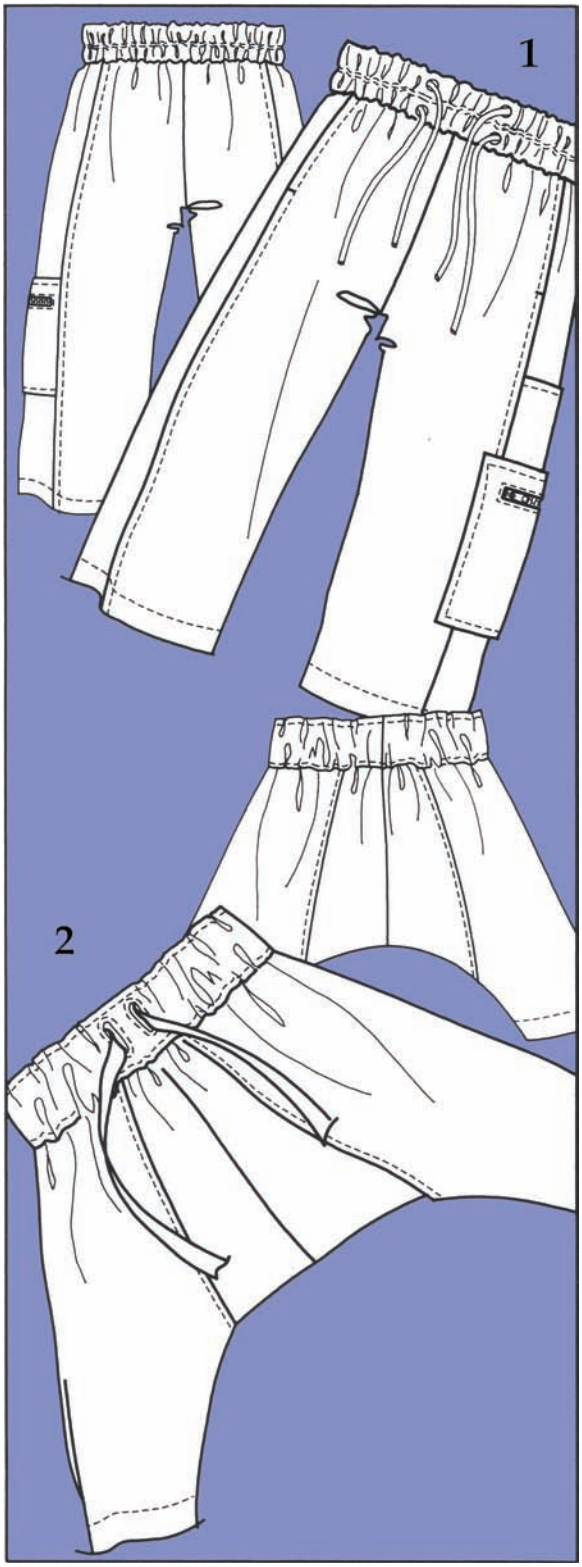


The simple skirt block



The very simple skirt block



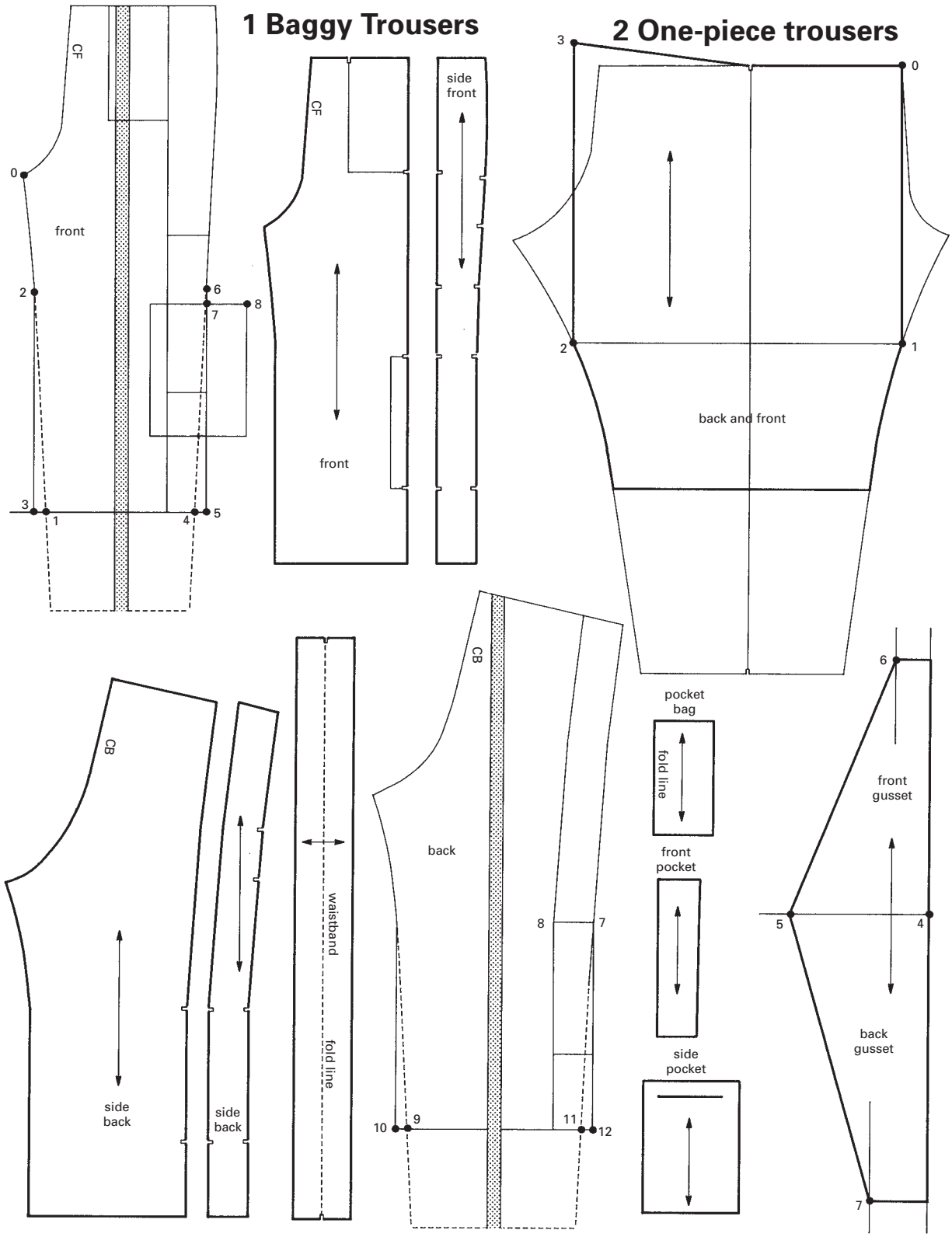


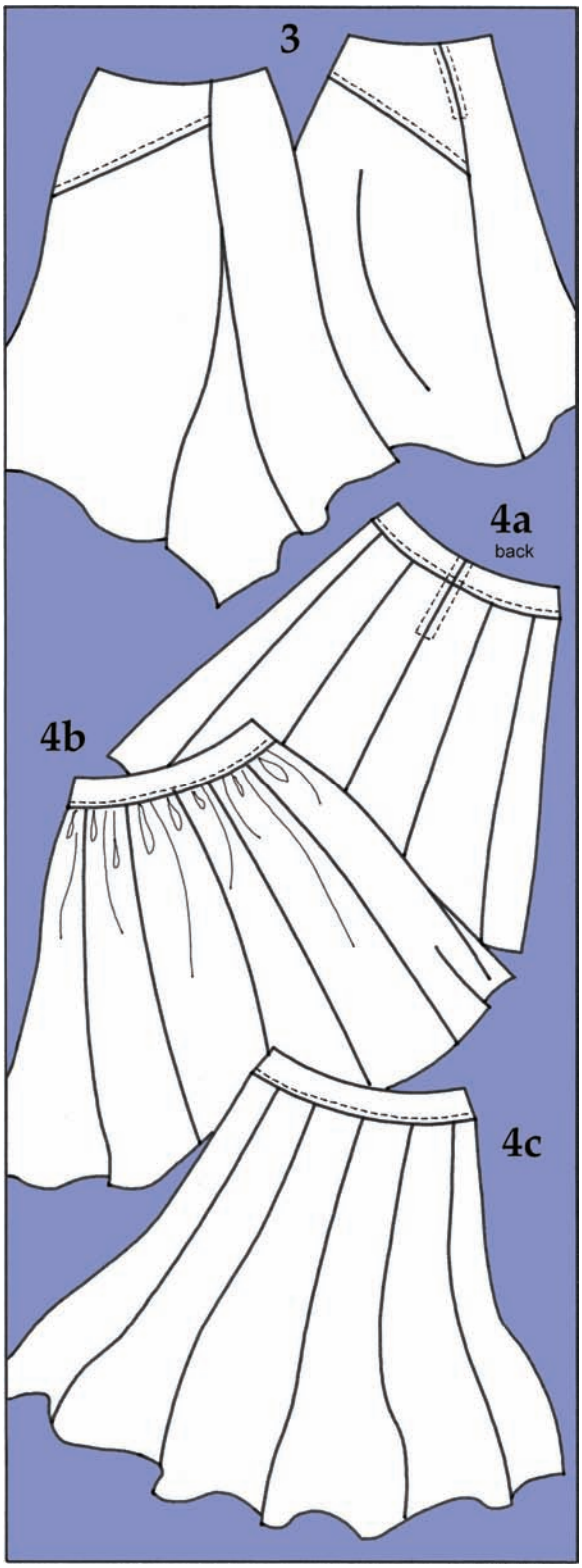
1 *'Baggy' trousers*

Trace off the back and front of the easy fitting trouser block.
Shorten to the required length.
If very baggy trousers are required, cut up the centre lines and open required amount.
Front Draw in side panel line.
Mark points 0–1 on the inside leg seam.
Extend the line from 1.
0–2 is one third distance 0–1; square down to 3.
4–5 = 1–3; square up to 6.
Draw in the pocket bag from the side panel line.
Draw in the front pocket.
Draw in the side pocket; mark points 7 and 8.
Trace off front and side front.
Back 9–10 and 11–12 are the measurement 1–3; square up to the inside leg seam and side seam.
Draw in the side panel line, width is the measurement 7–8 on the side pocket. Mark side pocket.
Trace off back and side back.
Pockets Trace off pocket bag, front pocket and side pocket.
Waistband construct a waistband: measurement of the waistline of the patterns created and twice the width required. Mark fold line down centre.

2 *One-piece trousers*

Trace off the very easy fitting trouser block.
Back and front Shorten to the required length.
Square down from 0 at the centre front to 1.
Square across to 2. Square up to 3, 3 cm above waistline.
Extend the back waistline to 3.
Gusset Draw a vertical line, length 110 cm.
Mark point 4 at the centre; square out.
4–5 approx. 24 cm.
Draw a line 8 cm long, parallel to the top of the vertical line.
Draw a line 12 cm long, parallel to the bottom of the vertical line.
5–6 is the measurement 0–1; square across.
5–7 is the measurement 2–3; square across.
Waistband Construct a waistband as above.


1 Baggy Trousers
2 One-piece trousers
CF
front
0
2
6
7
8
3
1
4
5
CF
front
side
front
3
0
2
1
back and front
CB
side
back
side
back
waistband
fold line
CB
back
8
7
10
9
11
12
pocket
bag
fold line
front
pocket
side
pocket
6
front
gusset
5
4
back
gusset
7



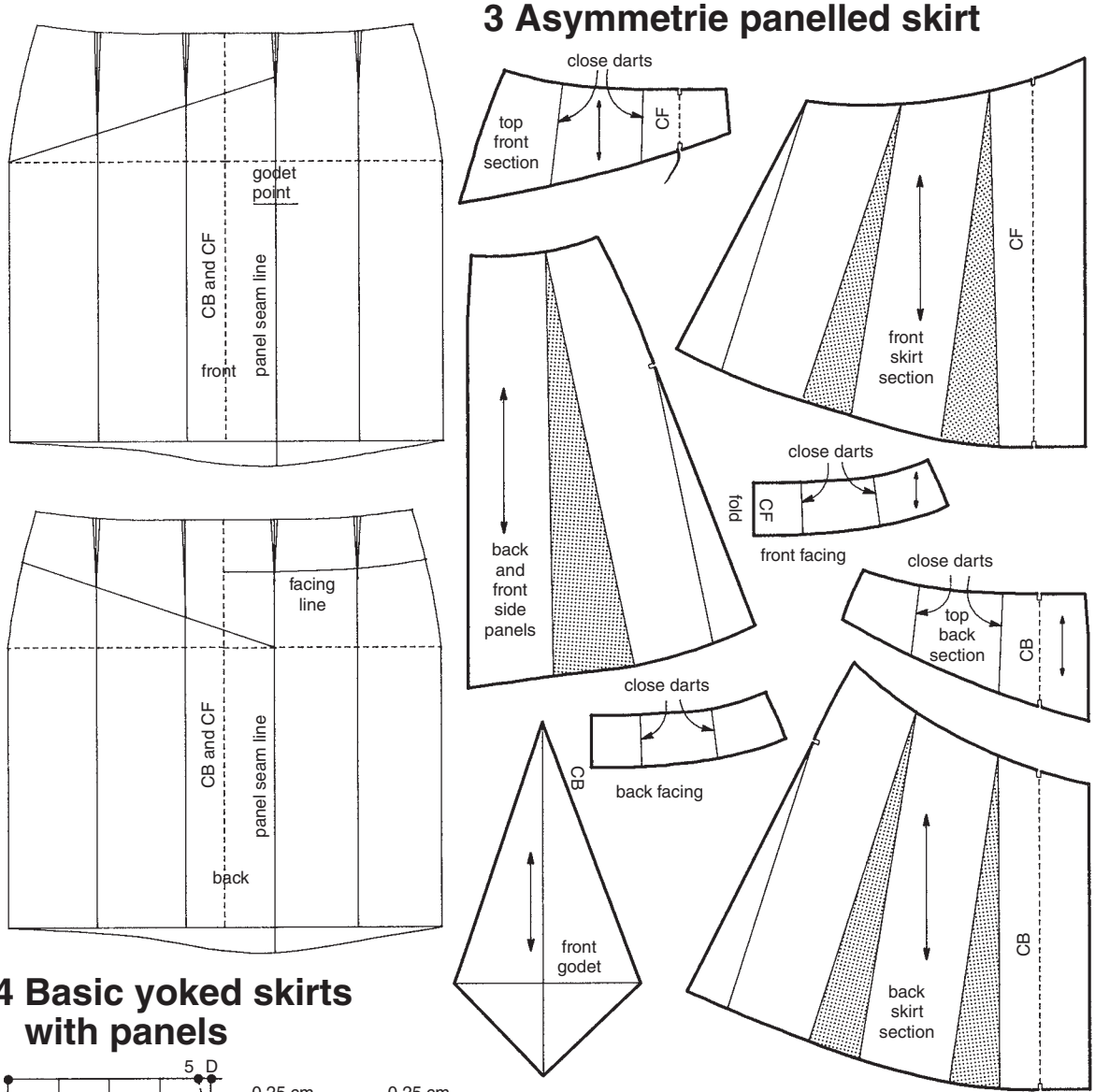
3 *Asymmetric panelled skirt*

Trace the very simple skirt block. The pattern is based on cutting on the right side of the fabric.
Mirror and duplicate blocks to create separate back and front sections.
Mark panel seam lines on back and front skirts.
Draw in asymmetric hemlines, lowering the lines at base of side panel.
Mark different asymmetric style lines at the top of back and front sections.
Draw in facing line (5 cm depth) to centre front on back section of skirt. Mark a godet point on front panel line.
Draw in shaping and darts (approx. 5 cm long) on side panels and top sections of the skirt, to finished low waist measure (80 cm).
Extend the darts on the top sections to style line.
Divide side panels and lower skirt sections as shown.
Back and front side panels Trace off side panels. Cut up lines and insert flare, closing waist darts. Add 5 cm flare at side seam hemline.
Lower skirt sections Trace off lower skirt sections. Cut up all panels; insert required amount of flare. Add 5 cm flare at side seam hemline.
Top sections Trace off top sections and close darts.
Godet Construct a godet to length and width required.
Back and front facings Trace off facing, close darts.

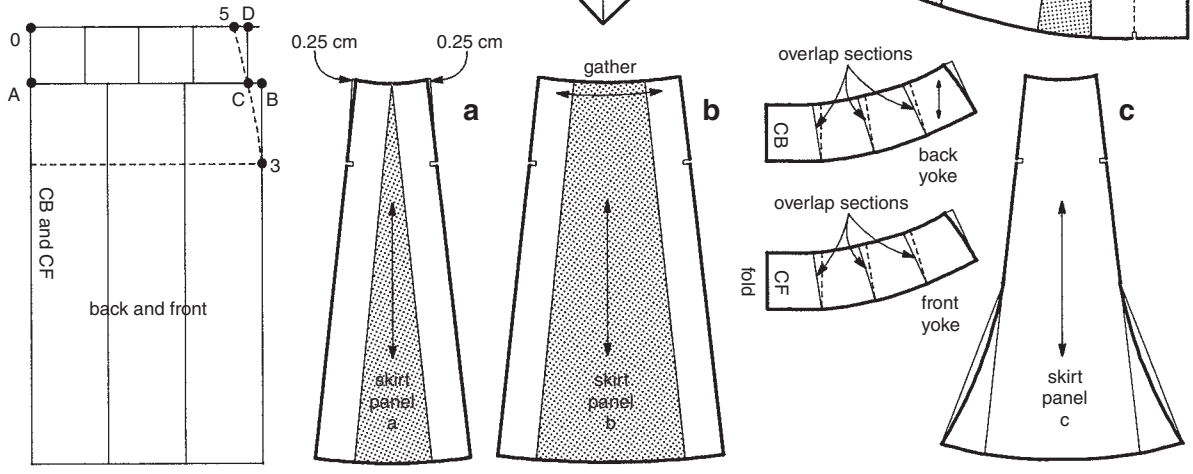
4 *Basic yoked skirts with panels*

Trace the very simple skirt block; ignore the curved waistline.
Mark points 0, 3 and 5 from the block.
0–A yoke depth (example is 6 cm). Square across.
Square up from point 3 on hipline to point B.
Skirt panels Divide the line A–B into a quarter the number of panels in the skirt (example shows a twelve panelled skirt). Trace off one panel.
Mark point C on side seam at yoke line; measure the distance C–B. (example is 1.5 cm).
The top of each panel must be reduced by 0.5 cm to fit the original yoke measurement. Shape to hipline.
Many panel variations can be made, for example:
(a) Panel is divided, and flare is inserted.
(b) Extra ease is inserted for gathers.
(c) Extra low flare is added.
Yoke Extend the line from 0–5. Square up from C to point D on waist. Divide the rectangle 0, A, C, D into four sections. Trace off the sections.
Measure the distance 0–D and subtract one quarter the low waist measure. (Example: 23.6 – 20 = 3.6 cm). Divide by four (0.9 cm). Overlap each section of the yoke at the waistline 0.9 cm.
Shape in side seam 0.9 cm at waist. Trace round new yoke shape, curving waistline and side seam.

3 Asymmetrie panelled skirt



4 Basic yoked skirts with panels



Easy fitting body shapes

The basic shirt block

Measurements required to draft the block

The block can be drafted to size codes 8, 10, 12, etc, or to XSMALL, SMALL, MEDIUM, LARGE, XLARGE from any of the size charts in this book (pages 12–14). Personal measurements (see page 178) can also be applied to the block.
A size MEDIUM from the size chart on page 12 (for fashion garments) is used for this illustrated example.

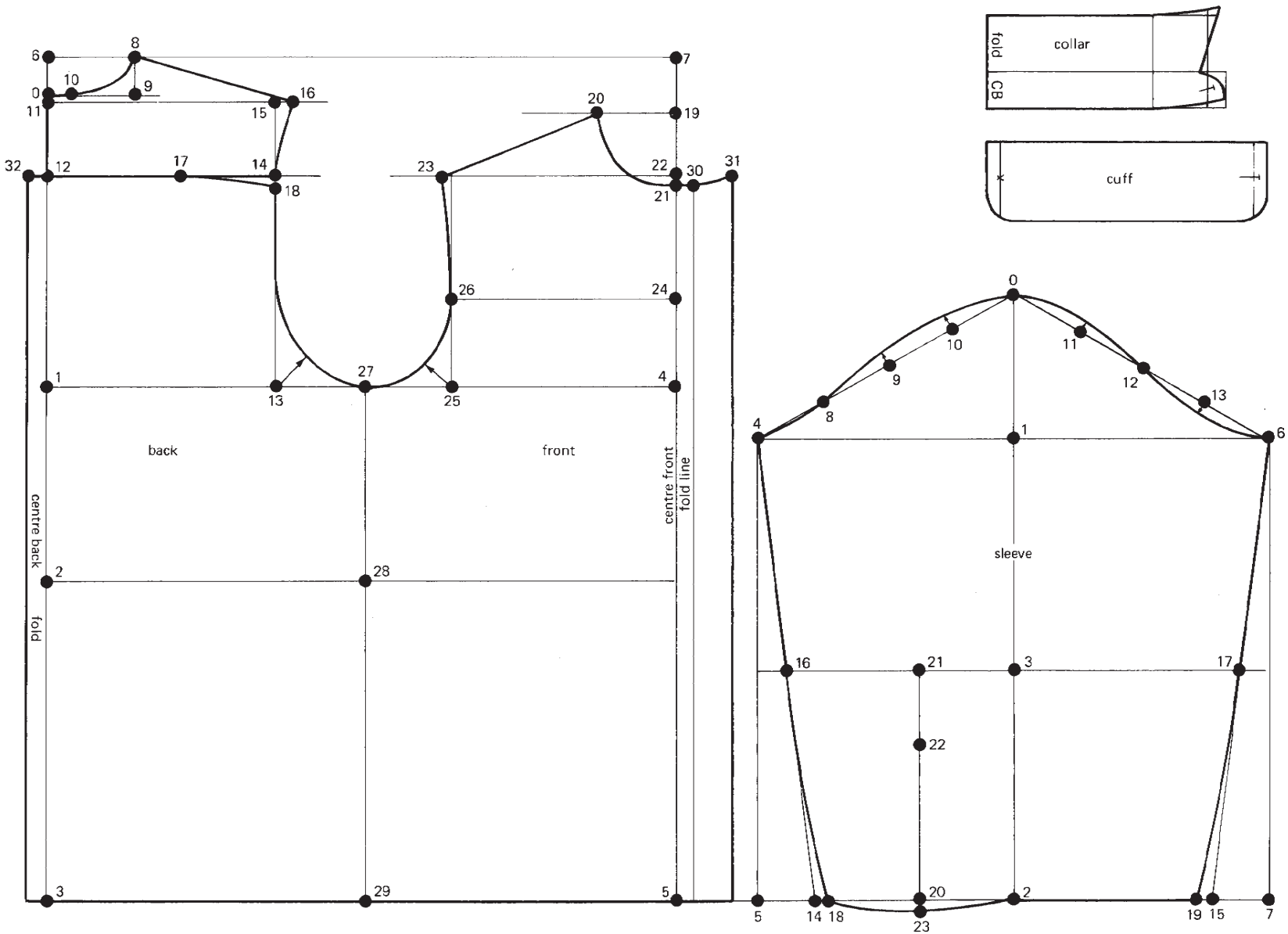
bust	88 cm	neck size	37 cm
nape to waist	41 cm	sleeve length	58.5 cm
armscye depth	21 cm	cuff size – shirts (page 13)	21.5 cm
back width	34.4 cm		

Body sections
Square up and down from 0; square across approx. 10 cm.
0–1 armscye depth plus 2.5 cm; square across.
0–2 neck to waist; square across.
0–3 shirt length required; square across.
1–4 half bust plus 9.5 cm; square up, square down to 5.
0–6 3.5 cm; square across to 7.
6–8 one fifth neck size plus 0.2 cm; square down to 9.
0–10 one third measurement 0–9; draw curve from 8–10.
6–11 one fifth armscye depth minus 0.5 cm; square out.
0–12 one fifth the measurement 0–1 plus 1 cm; square half way across the block.
1–13 half back width plus 2.5 cm; square up to 14 and 15.
15–16 1.25 cm; join 8–16.
14–17 half the measurement 12–14 minus 1.5 cm.
14–18 0.5 cm; join 17–18 with a curve.
7–19 5 cm; square across.
19–20 one fifth neck size minus 0.6 cm.
19–21 one fifth neck size minus 1.6 cm.
Draw neck curve from 20–21.
19–22 one fifth armscye depth plus 0.5 cm; square out.
20–23 the measurement 8–16. Draw a line from 20 to touch the line from 22.
21–24 half the measurement 4–21 plus 1 cm; square across.
4–25 the measurement 1–13 minus 0.2 cm; square up to 26.
25–27 half the measurement 13–25; square down to 28 and 29. Draw armscye as shown in diagram, touching points 16, 18, 27, 26, 23; and to touch points 2.75 cm from 13 and 2.25 cm from 25.
21–30 1.5 cm buttonstand; square down.
30–31 3.5 cm facing; square down. Shape neckline.
12–32 2 cm (back pleat); square down.

Sleeve
Square down from 0.
0–1 one quarter armscye measurement (see measuring a curve on page 27): square across.
0–2 sleeve length minus cuff depth plus 2 cm ease; square across.
1–3 half the measurement 1–2; square across.
0–4 half armscye measurement; square down to 5.
0–6 half armscye measurement, square down to 7.
Divide 0–4 into four sections; mark points 8, 9, 10.
Divide 0–6 into four sections; mark points 11, 12, 13.
8–0 raise the curve: 1 cm at 9; 1.75 cm at 10.
Raise the curve at 11: 1 cm.
Hollow the curve at 13: 1 cm.
5–14 one quarter the measurement 2–5 minus 0.5 cm; join 4–14.
7–15 one quarter the measurement 2–7 minus 0.5 cm; join 6–15.
Mark points 16 and 17 on the line from 3.
14–18 1 cm; join 16–18 with a curve.
15–19 1 cm; join 17–19 with a curve.
20 midway 2–18; square up to 21.
21–22 one third the measurement 20–21.
20–23 0.75 cm; join 18–2 with a curve.

Cuff
Construct shaped cuff: length = cuff size plus 2 cm; cuff depth = approx. 7 cm. Mark buttonhole.
Draw curves at lower edge.

Collar
Construct a shirt collar (ref. 9 page 72).
Depth of shirt collar and stand approx. 8 cm.


back
front
centre back
fold
centre front
fold line
collar
fold
CB
cuff
sleeve

The basic 'flat' overgarment blocks

For easy fitting jackets and overgarments.

Measurements required to draft the block

The block can be drafted to size codes 8, 10, 12, etc, or to XSMALL, SMALL, MEDIUM, LARGE, XLARGE from any of the size charts in this book (pages 12–14). Personal measurements (see page 178) can also be applied to the block.
A size MEDIUM from the size chart on page 12 (for fashion garments) is used for this illustrated example.
The main figures construct the Jacket block, the figures in brackets the Overgarment block.

bust	88 cm	shoulder	12.2 cm
nape to waist	41 cm	back width	34.4 cm
waist to hip	20.6 cm	armscye depth	21 cm
neck size	37 cm	sleeve length	58.5 cm

Back and front sections

Square down and across from 0.
0–1 back neck to waist plus 3 cm; square across.
1–2 waist to hip; square across.
0–3 quarter bust measurement plus 4.5 cm (7 cm); square down to 4 and 5.
0–6 2 cm.
6–7 armscye depth plus 4 cm (6 cm); square across to 8.
6–9 half the measurement 6–7; square out.
6–10 quarter the measurement 6–9 minus 0.25 cm; square out.
0–11 one fifth neck size plus 0.4 cm (0.7 cm); draw back neck curve.
7–12 half across back plus 2.5 cm (4.5 cm); square up to 13 and 14.
14–15 1.5 cm; join 11–15.
Draw in back armscye shape to touch points 15, 13, 8.

Front section

0–16 one fifth neck size plus 0.4 cm (0.7 cm); draw in the front neck curve.
13–17 0.75 cm (1 cm).
Draw a line 0.75 cm below the line squared out from 10.
11–18 the measurement 11–15; draw front shoulder line to touch the new line at point 18.
Draw in the front armscye shape as shown in diagram to touch points 18, 17, 8.

Sleeve

0–1 half the measurement 6–7 on body block plus 1 cm; square across.
0–2 sleeve length plus 1 cm; square across.
0–3 the measurement of the armscye curve from 15–8.
2–4 two-thirds the measurement 1–3 plus 0.5 cm; join 3–4.
Divide 0–3 into six sections; mark points 5, 6, 7, 8, 9.
Draw in the back sleeve head:
hollow the curve 0.5 cm at 5;
raise the curve 1.5 cm at 8 and 9.
Draw in the front sleeve head:
hollow the curve 0.75 cm at 5;
raise the curve 1.75 cm at 8 and 9.

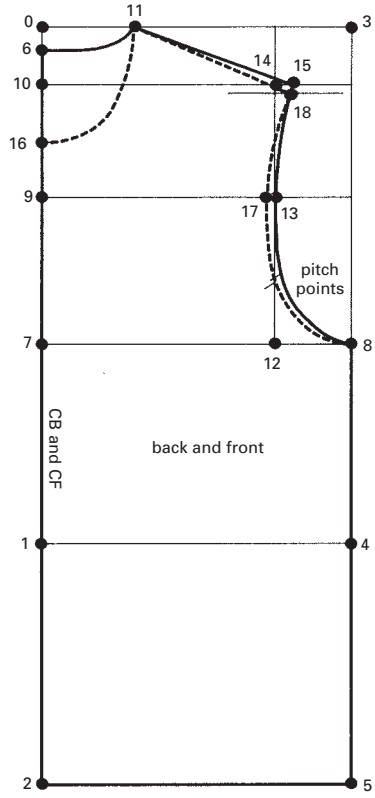
Sleeve pitch points

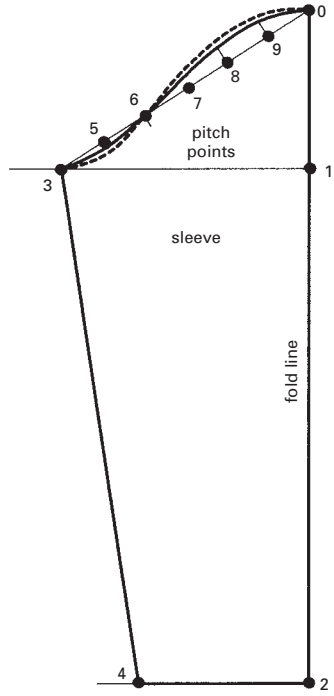
Some sleeve adaptations require pitch points on the sleeve and body sections.
Mark point 6 on the sleeve as a pitch point with a notch. Measure the sleeve curve from 3–6.
Measure along the armscye of the body sections the same distance. Mark the pitch points with a notch.

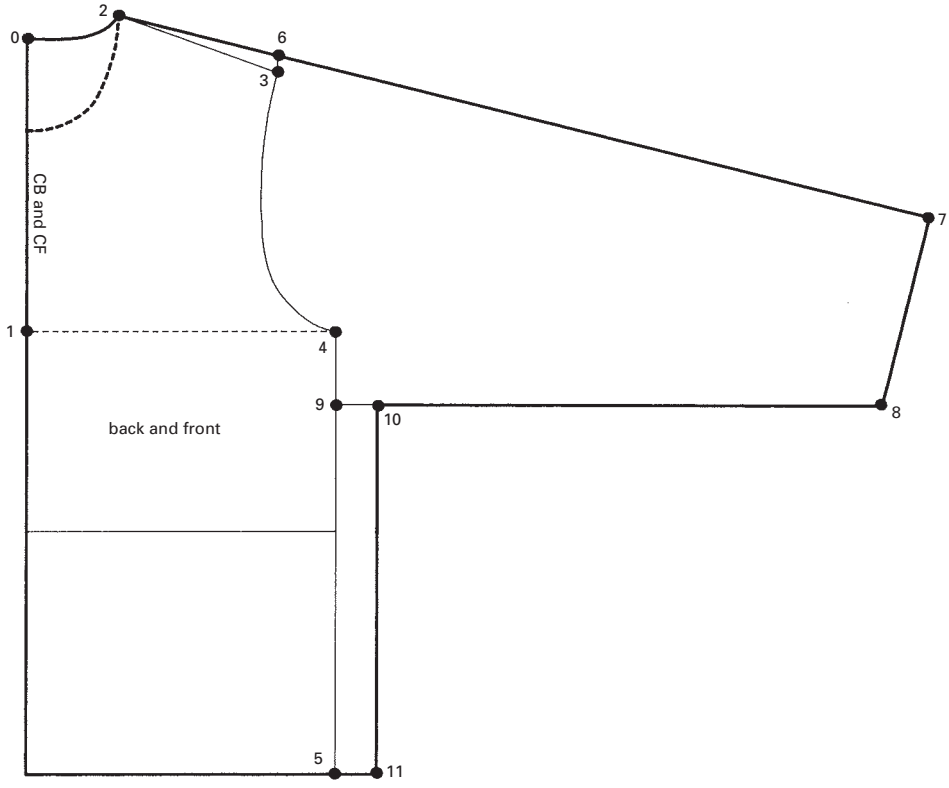
The 'flat' kimono block

Body sections

Trace round basic back body shape of jacket, or overgarment blocks with the front neckline and armscye depth line marked.
Mark points 0, 1, 2, 3, 4, 5.
3–6 l.5 cm. Join 2–6; extend the line.
6–7 the sleeve length.
Square out from the line 2–7 the measurement 2–4 on the block sleeve used plus 2 cm. Mark point 8.
4–9 quarter the measurement 0–1.
9–10 2 cm; square down to 11. Join 10–8.


0
11
3
6
14
15
10
18
16
9
17
13
pitch
points
7
8
12
CB and CF
back and front
1
4
2
5


0
9
8
6
7
5
pitch
points
3
1
sleeve
fold line
4
2

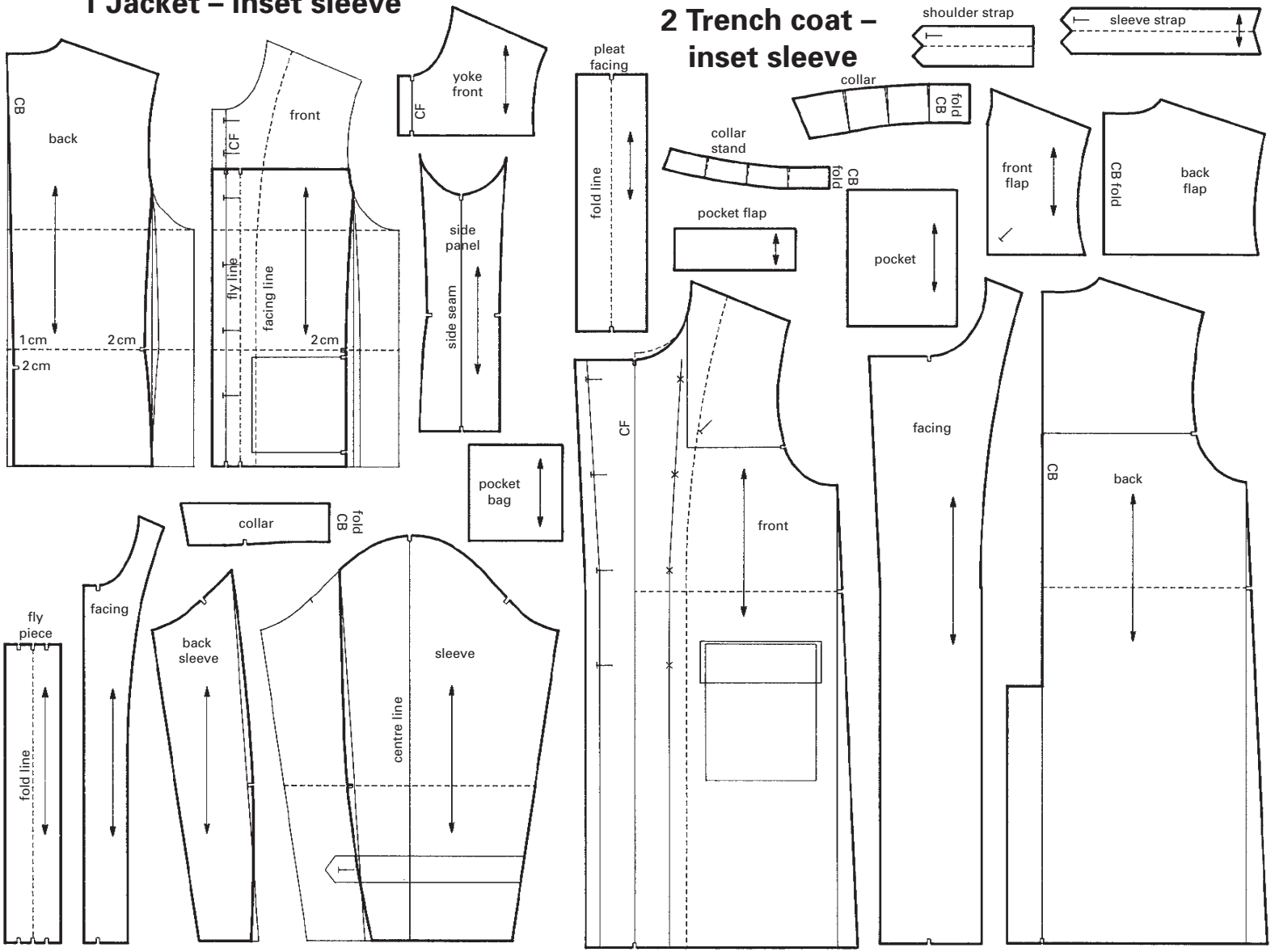

2
0
6
3
CB and CF
7
1
4
9
10
8
back and front
5
11

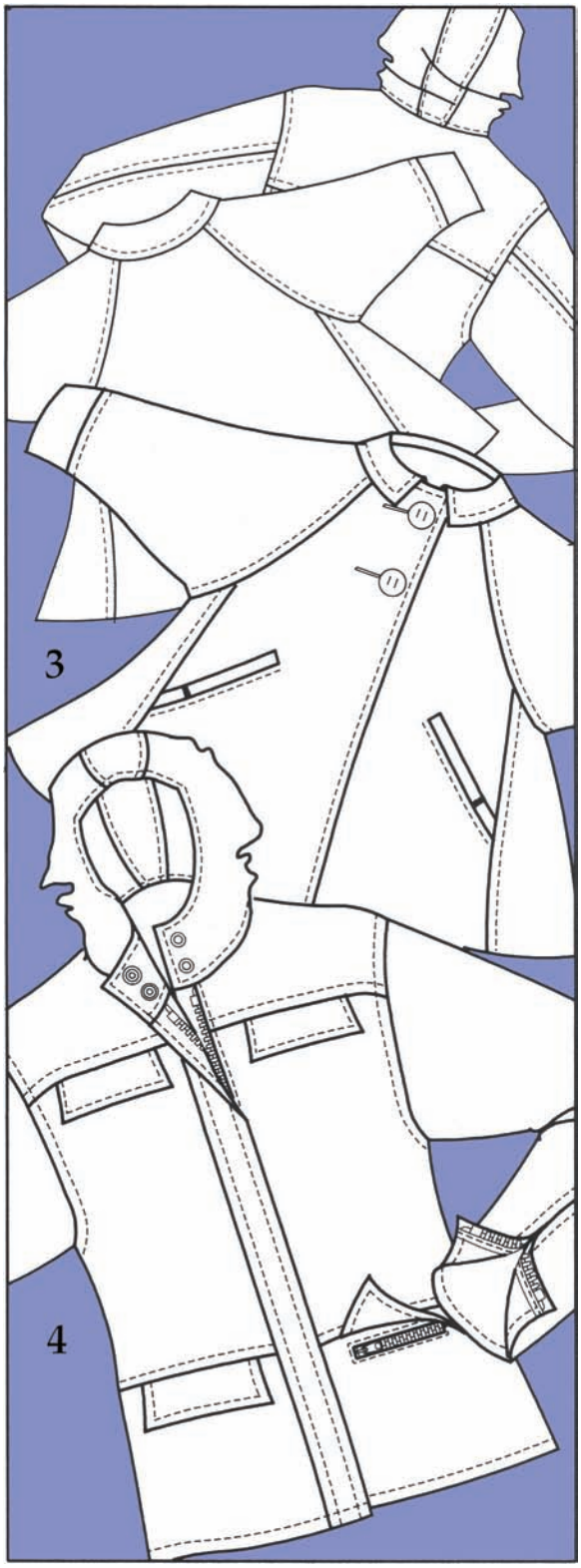
1 *Jacket – inset sleeve*

Trace off the back, front and sleeve of the 'flat' easy fitting jacket block.
Back and front Shorten to the required length. Draw in vertical lines at the side panel positions.
Back Shape in the centre back seam 1 cm and lower the waist position 2 cm.
Shape in at the waist of the back panel line 2 cm.
Trace off the back.
Front and front yoke Shape in the waist of the front panel line 2 cm; square down to the hipline. Draw in the front yoke line.
Draw in the buttonstand, mark buttonholes; mark the fly line.
Draw in the facing line. Draw in the pocket bag.
Trace off the front and front yoke.
Side panel Trace off front side panel and reverse the section.
Trace off back side panel and join to the front panel at the side seam.
Sleeves Reverse front sleeve along the centre line. Mark elbow line halfway down the underarm seam. Draw a back seam line.
Separate the sleeves. Shape both sleeves 1 cm out at elbow and 1 cm in at the hem.
Facing and fly piece Trace off facing. Trace off fly piece along the fly line; reverse the piece along the fold line.
Collar Construct convertible collar (ref. 8 page 72).
Pocket bag Trace off pocket bag.

2 *Trench coat – inset sleeve*

Trace off the back, front and sleeve of the 'flat' overgarment block.
Back and front Lengthen to the required length. Add 3 cm flare to side seam hem.
Draw in back and front flaps.
Back Add 5 cm pleat extension. Construct 10 cm pleat facing. Trace off back flap.
Front Lower front neck 1 cm.
Draw in buttonlines, add buttonstand and rever, mark buttonholes. Draw in facing line.
Trace off front flap.
Draw in pocket and pocket flap.
Sleeves Construct as above example. Draw in sleeve strap 3.5 cm. Trace off strap.
Facing and collar Trace off facing.
Measure neck to centre front. Construct a shirt collar without button extension (ref. 9 page 72).
Construct a small collar tab the width of collarstand.
Pockets Trace off pocket and pocket flap.
Shoulder strap Construct shoulder strap, length of shoulder and twice the width required.


1 Jacket – inset sleeve
back
CB
1 cm
2 cm
2 cm
front
CF
fly line
facing line
2 cm
yoke
front
CF
side
panel
side seam
pocket
bag
collar
fold
CB
fly
piece
fold line
facing
back
sleeve
sleeve
centre line
2 Trench coat –
inset sleeve
shoulder strap
sleeve strap
pleat
facing
fold line
collar
fold
CB
collar
stand
fold
CB
front
flap
back
flap
CB fold
pocket flap
pocket
CF
front
facing
CB
back



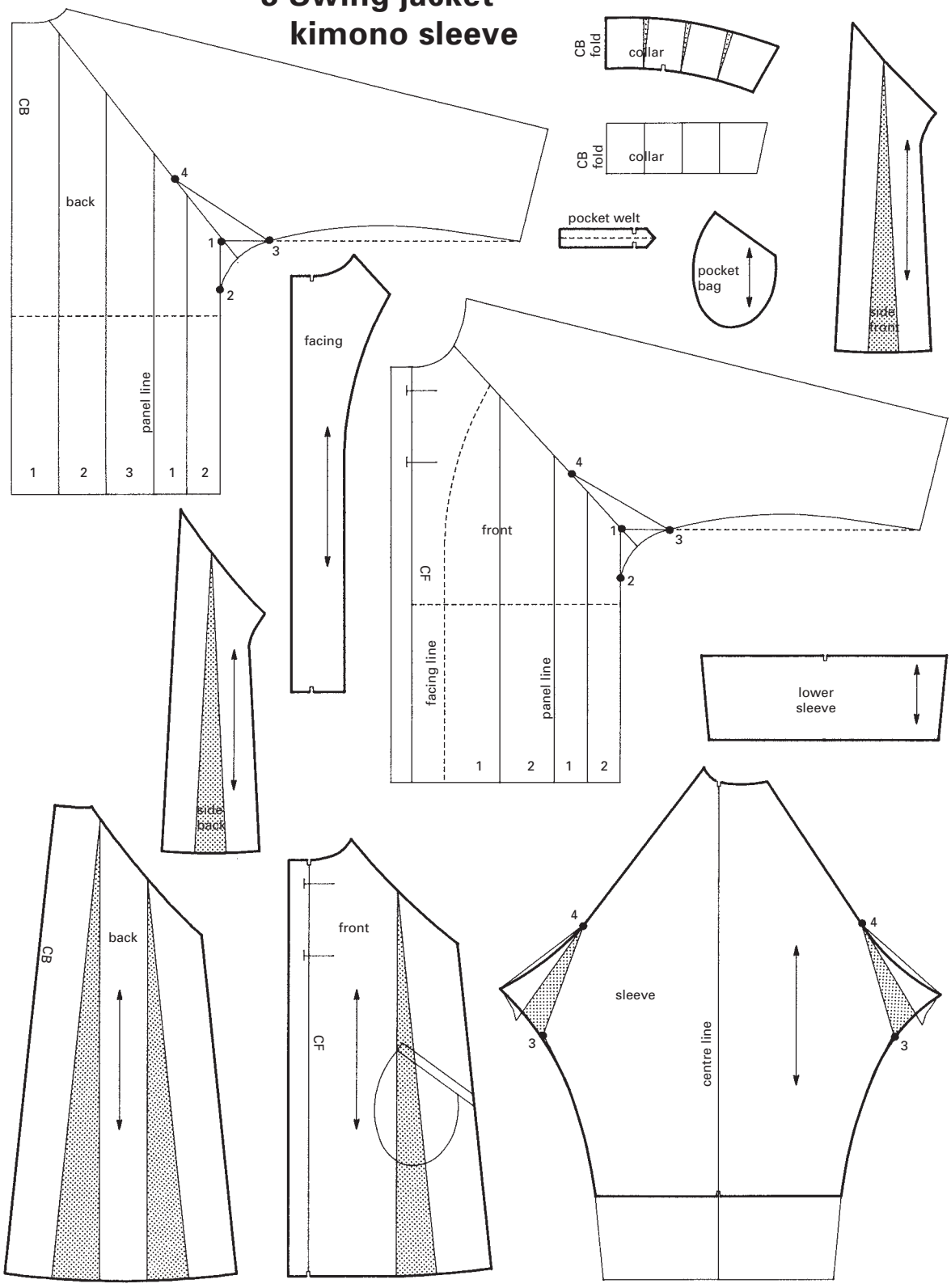
3 *Swing jacket/coat – kimono sleeve*

Trace off the back and front of the required 'flat' kimono block.
Back and front Extend to the required length. Mark point 1 at the underarm. 1–2 5 cm; 1–3 5 cm; join 2–3 with a curve. Draw in raglan seams. Mark 4 one third length of raglan seam. Join 3–4. Curve the sleeve seam.
Draw in side panel lines. Divide back into three sections, front and side panels into two sections. Draw in the buttonstand, buttonholes and facing.
Back Trace off back section. Cut up the dividing lines and open at the hem the required amount.
Front Trace off front section. Cut up the dividing line and open at the hem the required amount. Draw in pocket welt and pocket bag.
Back and front side panels Cut up the dividing line and open at the hem the required amount.
Sleeve Trace off sleeves. Reverse front sleeve and join on the centre line. Cut along the lines 3–4 and open approx. 4 cm. Redraw the sleeve curves. Draw lower sleeve line. Trace off lower sleeve.
Collar and facing Trace facing. Construct shaped convertible collar without stand (ref. 8 page 72).
Pockets Trace off welt and pocket bag.

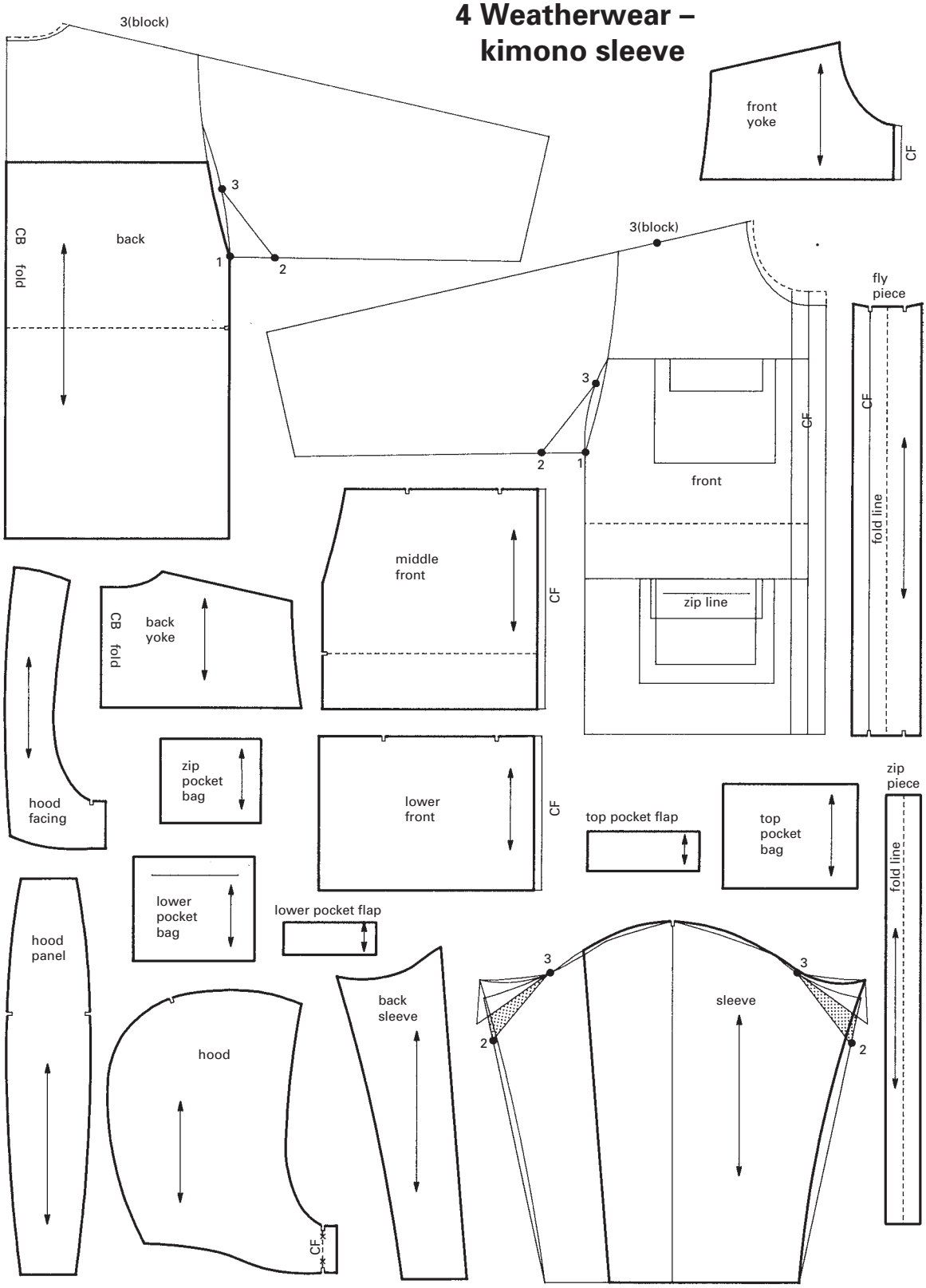
4 *Weatherwear – kimono sleeve*

Many variations of this style can be applied. Weatherwear is usually fully self lined.
Trace off the back, front and sleeve of the easy fitting 'flat' kimono block.
Attached hood only: lower back neck 0.5 cm; widen back and front neck 1 cm; lower front neck 1 cm.
Back and front Draw in armscye shape from approx. 5 cm past shoulder point 3 on the original block.
Take 1 cm darts from sleeve sections; two thirds length of back armscye, half the length of front armscye.
Mark point 1 at the underarm. 1–2 5 cm; 1–3 10 cm. Join 2–3.
Back Draw in back yoke line. Trace off yoke.
Front sections Reverse front. Draw in front yoke and lower panel line. Draw in pocket flaps and pocket bags. Draw in pocket zip line. Draw in the fly piece approx. 2.5 cm each side of centre line.
Trace off the three front panels. Reduce the front edge of the panels by the width of the zip.
Sleeves Trace off sleeves. Join on the centre line. Cut along the lines 2–3 and open approx. 3 cm. Redraw sleeve head and underarm with curves. Draw in back seam line. Trace off back sleeve.
Fly piece and zip extension Trace off fly piece along the fly line. Trace off zip piece from the centre line. Reverse both pieces along the fold lines.
Pockets Trace off pocket bags and pocket flaps.
Hood Construct hood (ref. 5 page 155).

3 Swing jacket – kimono sleeve



4 Weatherwear – kimono sleeve



PART TWO: FLAT CUTTING

10 Basic and easy fitting garments (jersey and knitted fabrics)

Basic and easy fitting blocks for jersey wear **150**

Basic and easy fitting tee shirt, track suit and jersey blocks *150*
Raglan adaptation 150
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1b Easy fitting smock top 152
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Hoods *157*
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Knitwear blocks *158*

The basic grid *158*
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2 Extended shoulder 160
3 Raglan sleeve 160

Computers and knitted garment shapes 162

Special notes on fashion styles

The basic tee shirt block is based on body measurements with minimum ease, thus allowing the stretch or styling to take care of body movement. As well as basic fitted tee shirts, it is also used for many fashion garments in the low or medium price range because it offers a simple means of styling and an adaptable fit.

Jersey fabric allows simple basic shapes to be cut that will stretch and drape around the body. The type of tops illustrated on page 152 can have a close or easy fit depending on the block that is chosen to adapt.

Sizing

Sportswear and some casual wear manufacturers usually use sizing breaks of XSMALL, SMALL, MEDIUM, LARGE and XLARGE. The example sizings used in the following drafts are based on size MEDIUM, High-street fashion garments. See page 12.

Basic and easy fitting blocks for jersey wear

Basic and easy fitting tee shirt, track suit and jersey blocks

Instructions are given for three jersey block fittings from this block draft.
The three block fittings are:
(1) A basic body fit with no ease allowance for basic fitting tee shirt tops and dresses; main instructions.
(2) A block with 2 cm ease allowance for easy fitting tee shirts, tops and dresses (first brackets).
(3) A block with 4 cm ease for track suits and fleece jackets (second brackets).
The illustration shows (2) the easy fitting tee shirt block.

Measurements required to draft the block

The block can be drafted to size codes 8, 10, 12, etc, or to XSMALL, SMALL, MEDIUM, LARGE, XLARGE from any of the size charts in this book (pages 12–14). Personal measurements (see page 178) can also be applied to the block.
A size MEDIUM from the size chart on page 12 (for fashion garments) is used for this illustrated example.

bust	88 cm	shoulder	12.2 cm
nape to waist	41 cm	back width	34.4 cm
waist to hip	20.6 cm	armscye depth	21 cm
neck size	37 cm	sleeve length (jersey)	54.5 cm

Body sections
Square down and across from 0.
0–1 neck to waist; square across.
0–2 finished length; square across.
0–3 armscye depth is basic measurement; (plus 1 cm) (plus 4.5 cm); square across.
0–4 half the measurement 0–3; square across.
0–5 one quarter the measurement 0–4; square across.
0–6 one fifth neck size; (plus 0.25 cm) (plus 1 cm); square up.
6–7 1 cm; draw in neck curve.
3–8 half back width is basic measurement; (plus 0.5 cm) (plus 3.5 cm); square up to 9 and 10.
10–11 0.5 cm; (0.5 cm) (1.5 cm); join 7–11.
3–12 quarter bust is basic measurement; (plus 2 cm) (plus 4.5 cm); square down to 13.
Draw in armscye curve from 11 through 9 to 12.
9–14 one fifth neck size minus 1.5 cm; (minus 1.5 cm) (minus 0.5 cm); draw in front neck curve.
Back and front are the same except for the neck curve.

Sleeve
Square down from 15.
15–16 half the measurement 0–3 plus 1 cm.
15–17 jersey sleeve length plus 2 cm; (plus 3 cm) (plus 5 cm); square across.
15–18 the measurement of the diagonal line from 11–12 on the body section plus 1.5 cm (plus 2 cm) (plus 2 cm); square down to 19.
18–20 one third the measurement 18–15.
Draw in sleeve head.
18–20 hollow the curve 0.6 cm.
20–15 raise the curve 1.75 cm.
19–21 one third the measurement 17–19; join 18–21.

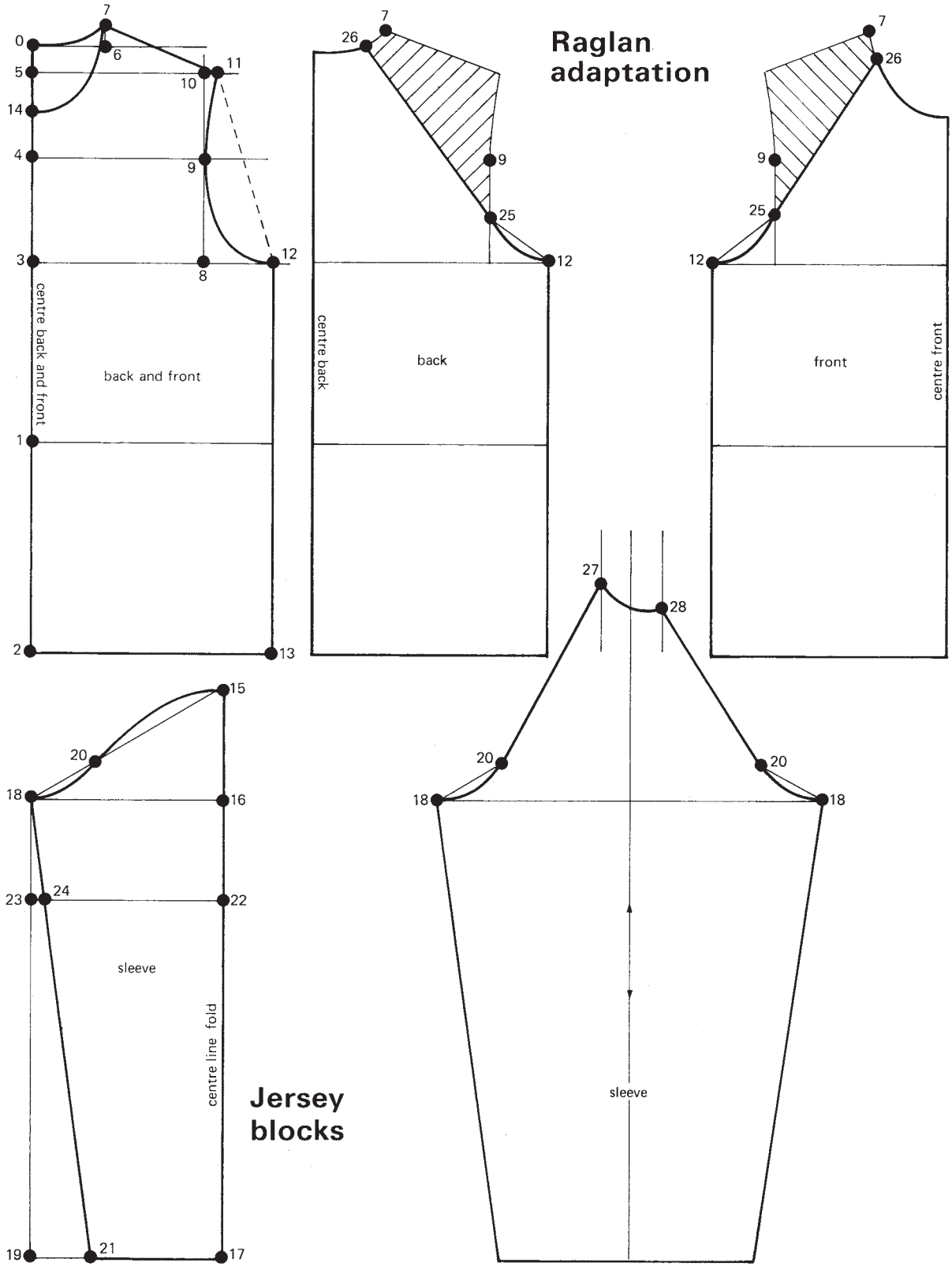
Short sleeve
15–22 sleeve length required; square across to 23.
23–24 dependent on the length approx. 2 cm (2.5 cm) (not applicable); join 18–24.

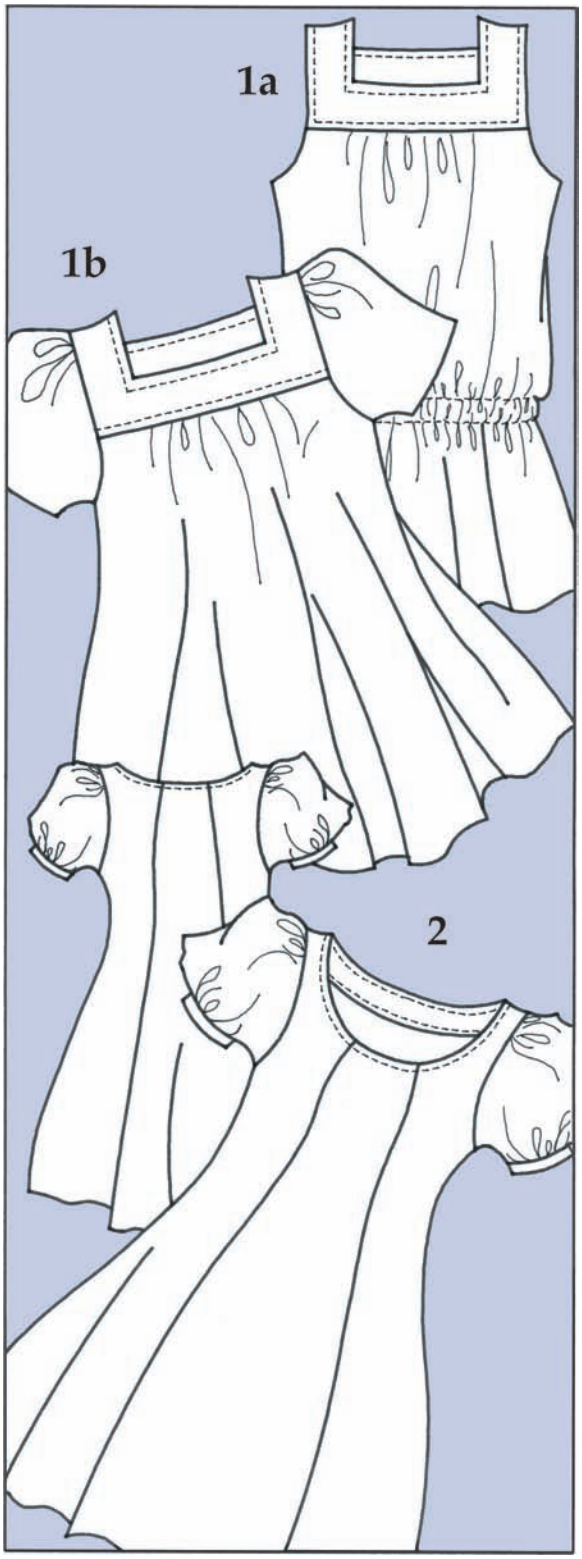
Raglan adaptation

Trace off block required.
Mark points 7, 9, 12, 18, 20.

Body sections
Delete the curve from 9–12.
12–25 the measurement 18–20 on sleeve; curve the line inwards 0.75 cm. 7–26 3 cm; join 25–26.
Cut away shaded sections.

Sleeve
Trace sleeve as full section.
Extend the centre line of sleeve.
Draw parallel lines each side of the centre line; the measurement of each line from the centre line is 3 cm.
20–27 the measurement 25–26 on the back.
20–28 the measurement 25–26 on the front.
Join 27–28 with a curve.


Raglan adaptation
0
5
14
4
3
1
2
6
7
10
11
9
8
12
13
centre back and front
back and front
26
25
centre back
back
front
centre front
Jersey blocks
15
20
18
16
23
24
22
19
21
17
sleeve
centre line fold
27
28
sleeve



1a Easy fitting tunic

Trace the easy fitting tee shirt block to length required.
Mark a horizontal yoke line. Mark point A at armscye edge on yoke line, B at side seam.
A–C = 1 cm.
Square up to shoulder line. Redraw armscye curve.
Draw in front and back square neckline.
Reduce depth of shoulder 1 cm at yoke neckline.
Draw in elastic casing lines approx. 8 cm below waistline.
Back and front sections Trace off back and front sections. B–D = 1 cm.
Add 1.5 cm flare at hem of side seam.
Draw side seam line from D to new hem point.
Add 10 cm to centre back line and centre front line.
Yoke Trace off yoke sections.

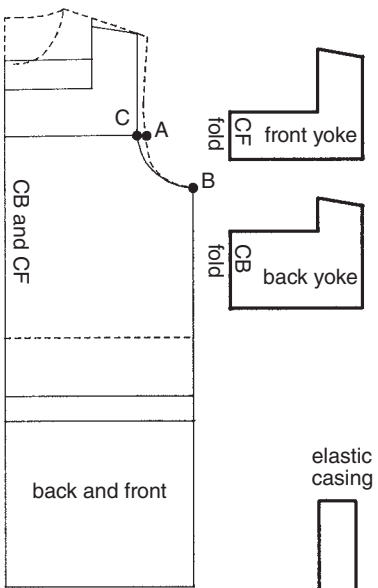
1b Easy fitting smock top

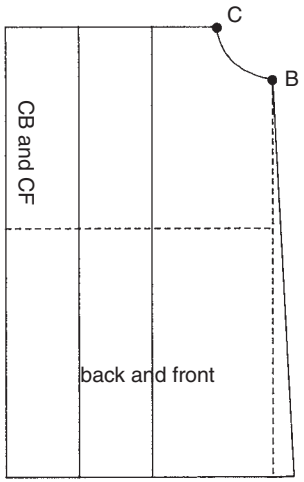
Trace off easy fitting tee shirt block to length required.
Construct yoke line and neckline as for easy fitting tunic.
Back and front sections Trace off back and front sections. Mark points C and B on armscye curve.
Add 3 cm flare at hemline.
Draw side seam line from B to new hem point.
Add 10 cm to centre back and centre front lines.
Divide the pattern into three sections.
Cut up section lines and insert approx. 6 cm of flare.
Yoke Trace off yoke sections.
Sleeve Trace off sleeve. E–F on the sleeve equals the distance C–B on body sections.
Divide the sleeve into three sections as shown.
Cut up section lines and open at the sleeve head.
Raise the sleeve head 3 cm.
F–G = 1 cm. Draw new sleeve outline as shown.

2 Basic tee shirt and dress adaptation

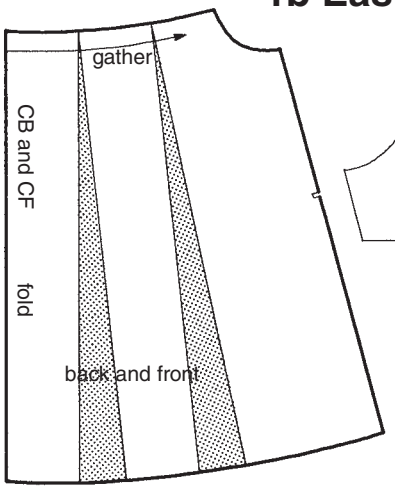
Back and front sections Trace off separate back and front sections of the basic tee shirt block.
Extend the block to dress length if required.
Mark tee shirt line approx. 13.5 cm below waistline.
Draw in new waistline approx. 5 cm above natural waistline. Draw in low neckline on back and front.
Draw in panel lines, 8 cm from the centre front and 9.5 cm from the centre back.
Construct a neckline dart on the front panel:
width = 0.6 cm, length = 5 cm.
Construct a neckline dart on the back panel:
width = 1.2 cm, length = 6.5 cm.
Back and front panels – tee shirt Trace of back and front panels to tee shirt length along panel lines and neckline dart lines.
Shape panel lines at waist and hips as shown.
Dress option Add extra flare required to hemline from the tee shirt line (illustration shows 4 cm on panel lines and 5 cm on side seams).
Sleeve Construct a puff sleeve (ref. 16 page 54).

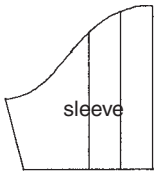
1a Easy fitting tunic

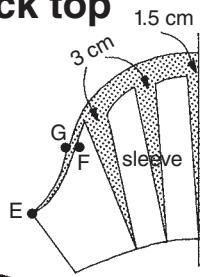


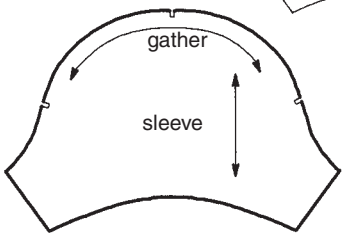


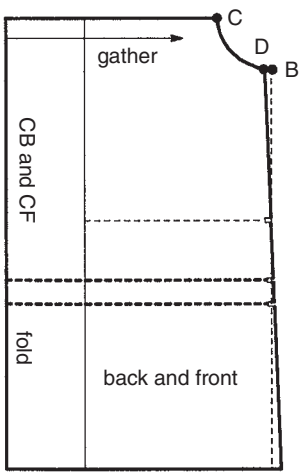
1b Easy fitting smock top

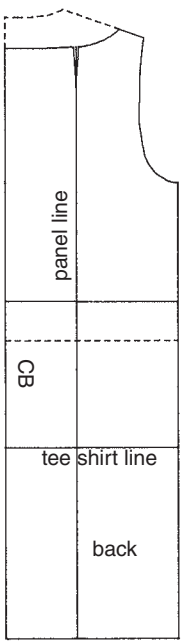


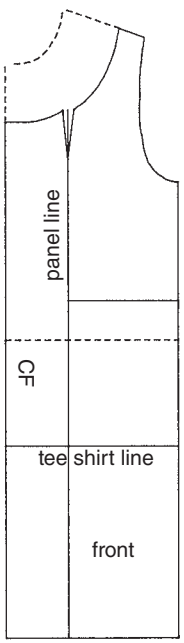




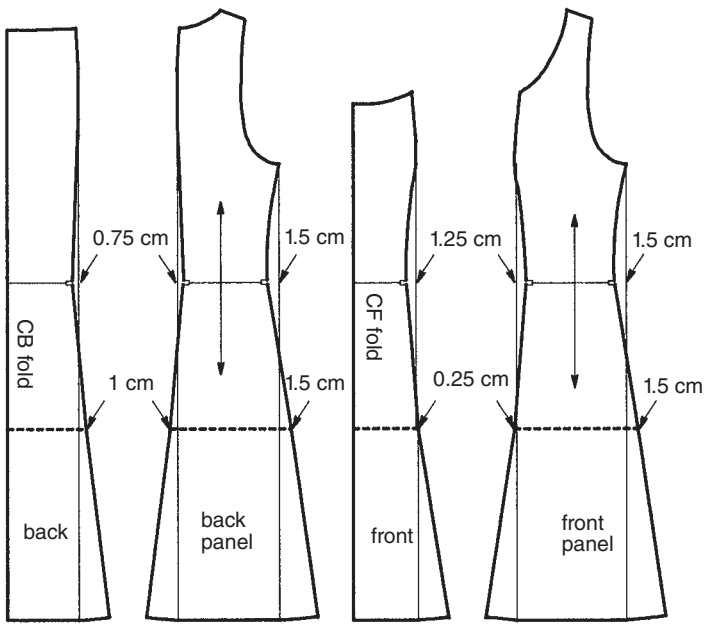


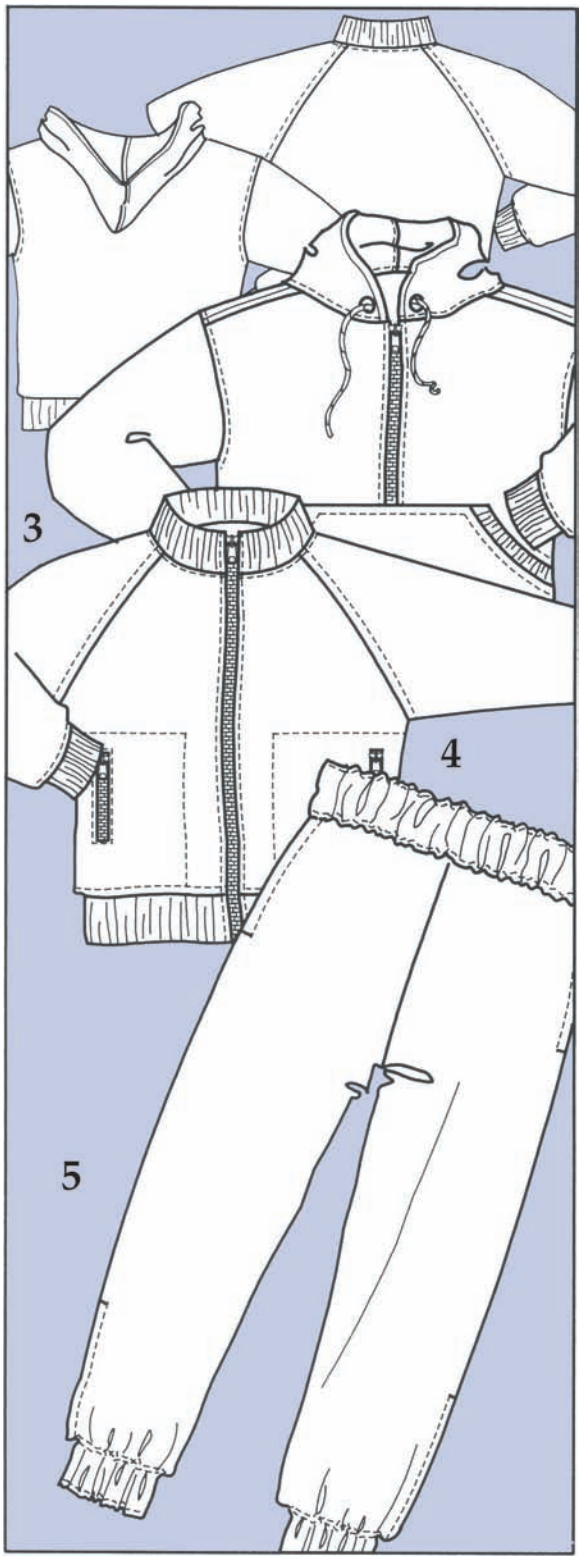






2 Basic tee shirt and dress adaptation





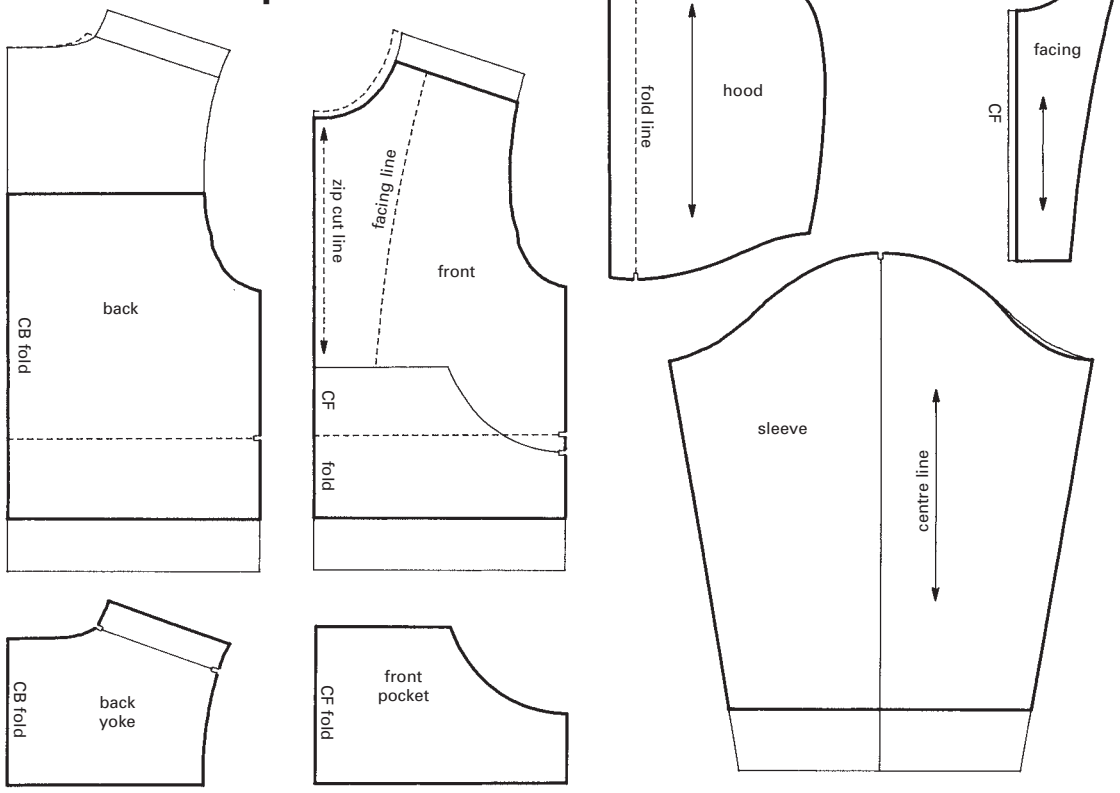
3 *Track suit top – inset sleeve*

Trace off the track suit block.
Back and front Shorten to the required length.
Shorten again by rib depth measurement.
Widen the neckline 1 cm at the shoulder; lower front neckline 1 cm.
Take a strip approx. 3 cm from the front shoulder and add to back shoulder.
Back Draw in back yoke line.
Trace off back yoke. Trace off the back section.
Front Draw in pocket shape.
Draw in facing line.
Trace off the front section.
Sleeves Reverse front sleeve along the centre line.
Hollow front curve of sleeve 0.7 cm.
Shorten sleeve by rib depth measurement.
Facing Trace off facing. Reduce centre front by half the zip width.
Hood Construct the simple hood to new neckline measurement (ref. 4 page 157).
Pocket Trace off the front pocket.

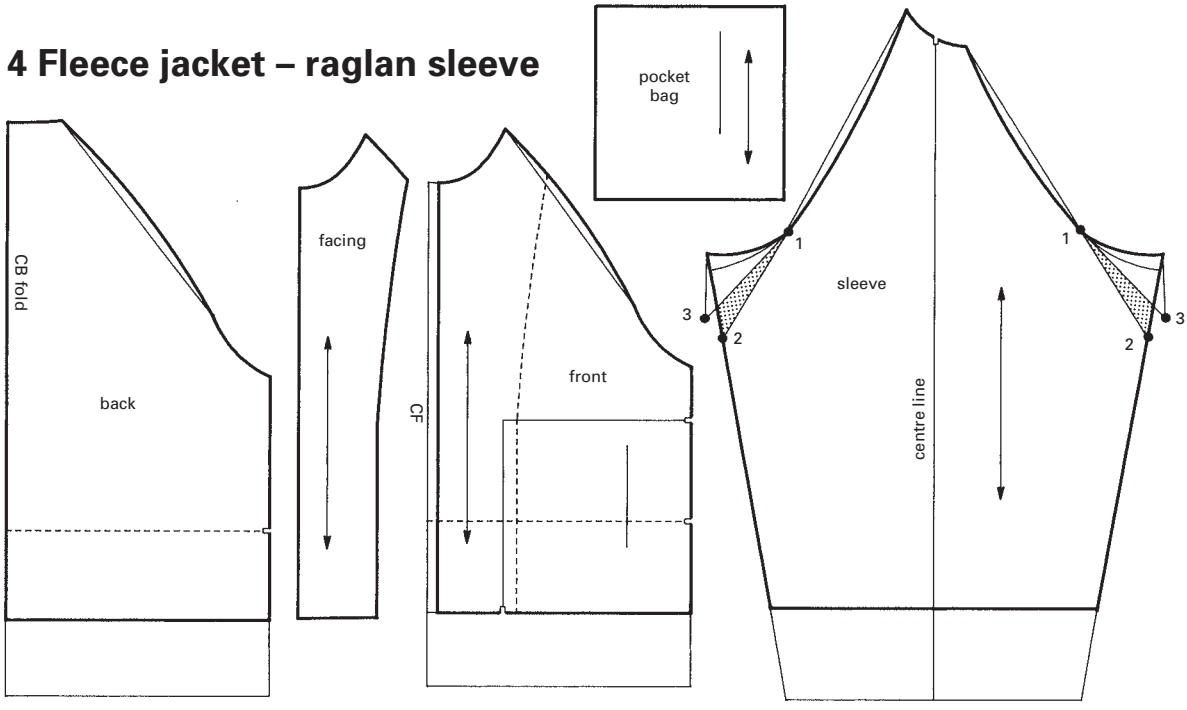
4 *Fleece jacket – raglan sleeve*

Trace off the track suit block.
Back and front Shorten to the required length.
Shorten again by rib depth measurement.
Construct basic raglan adaptation (page 150).
Curve the raglan lines outwards 0.7 cm.
Back Trace off the back section.
Front Draw in pocket shape and zip pocket position.
Reduce centre front by half the zip width.
Draw in facing line. Trace off the front section.
Sleeves Reverse front sleeve along the centre line.
Hollow the raglan lines 0.5 cm.
Shorten sleeve by rib depth measurement.
Mark point 1 at point 25 on the block.
Mark point 2, 5 cm from the underarm point.
Cut along the line 1–2 and open approx 2.5 cm to 3.
Redraw the raglan and underarm line.
Facing Trace off facing. Reduce centre front by half the zip width.
Collar Construct straight rib collar two thirds the measurement of the neck measurement or a standing straight fabric collar (ref. 6 page 72).
Pocket Trace off pocket.

3 Track suit top – inset sleeve



4 Fleece jacket – raglan sleeve



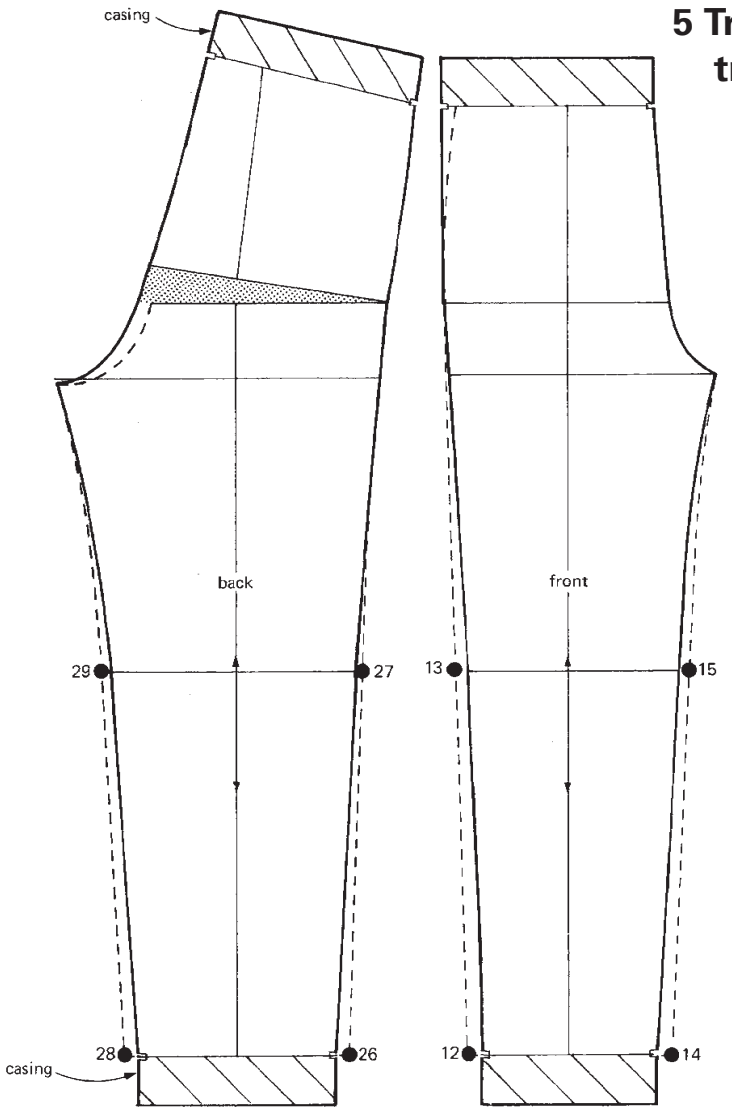
5 Track suit trousers

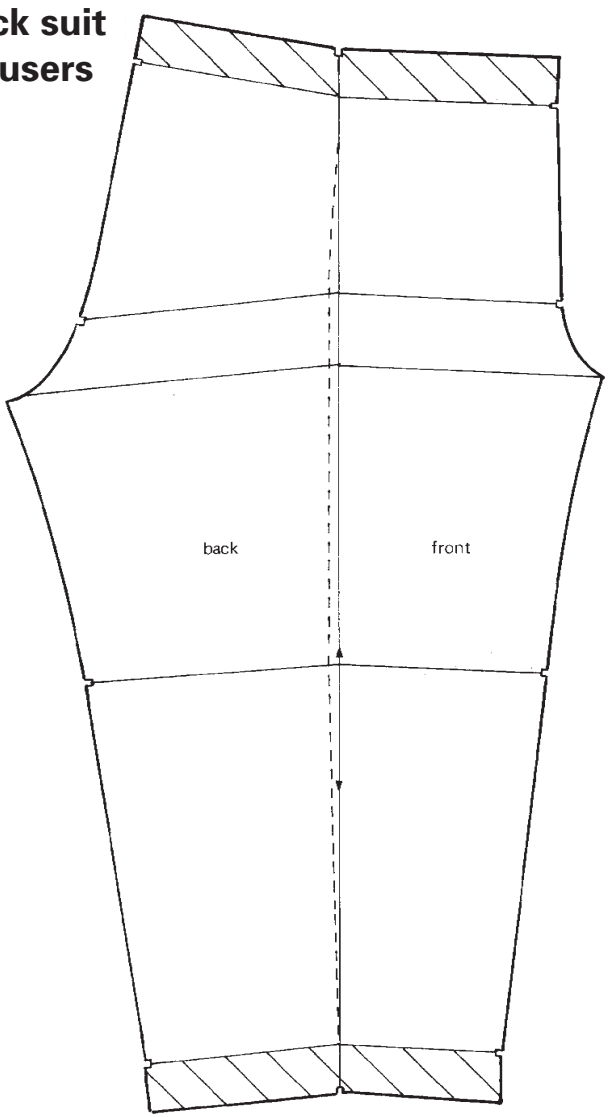
Trace off easy fitting trousers (page 132).
Mark points 12, 13, 14, 15, 26, 27, 28, 29.
Insert ease at the back crutch line (page 132); measurement of the seat wedge is 3.5 cm.
Reduce the trousers at the knee and hem if required.
Square up from front hipline to waistline.
Draw new side and inside leg seams as shown.
Add 5 cm to hem and waistline for casings.

Note The trouser leg can be cut in one piece.
Draw a vertical line.
Place side seams of front and back trousers together at waist and hem as shown.
Extra ease can be inserted at the original side seam position.

'Ski trousers'

Trace close fitting trouser block, insert ease at crutch line.
Narrow legs to required width.
The trouser legs can be cut in one piece as the track suit trousers, but a side dart will remain.





Hoods

Measure the neck

The neckline of hooded garments is usually lowered and widened. Measure the new neckline.

6 Simple hood

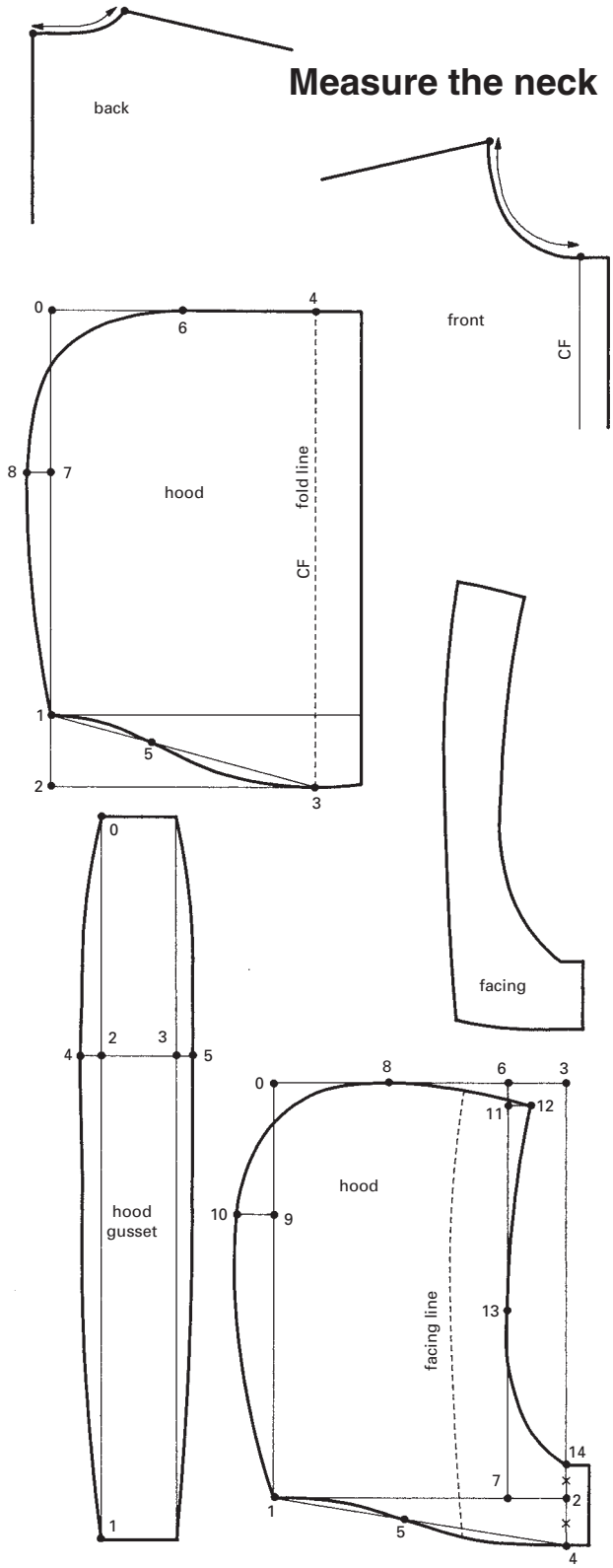
Square down and across from 0.
0–1 three quarters the nape to waist measurement plus 4 cm; square out.
1–2 6 cm; square out.
Draw a line from 1, measurement of front and back neckline, to touch the line from 2.
Mark point 3; square up to 4.
1–5 back neckline measurement.
Draw in neck curve.
Raise the curve 0.5 cm from 1–5.
Lower the curve 1 cm from 3–5.
0–6 half the measurement 0–4.
0–7 quarter measurement 0–1 plus 2 cm.
7–8 2 cm. Draw in the head curve 1, 8, 6, 4.
Extend the front line approx. 4 cm for a facing.

7 Gusseted hood

Square down and across from 0.
0–1 three quarters the nape to waist measurement plus 6 cm.
1–2 measurement of front and back neckline.
Square up to 3.
2–4 3.5 cm; join 1–4.
1–5 Back neckline measurement.
Raise the curve 0.5 cm from 1–5.
Lower the curve 1 cm from 4–5.
3–6 one fifth the measurement 0–3; square down to 7.
0–8 half the measurement 0–6.
0–9 quarter 0–1 plus 2 cm.
9–10 3 cm.
6–11 2 cm.
11–12 2 cm. Draw in head curve 1, 10, 8, 12.
6–13 half the measurement 6–7.
4–14 7 cm. Draw in front curve 12, 13, 14.
Add buttonstand, mark stud positions.
Draw in facing line; trace off facing.

Gusset

Draw a rectangle; length = head curve measurement, width = 6 cm.
Mark points 0 and 1.
0–2 one third the measurement 0–1; square across to 3.
2–4 and **3–5** 1.5 cm. Draw in gusset curves.



Knitwear blocks

Very easy fitting garments can be cut from simple basic shapes; this is particularly so if you are working with knitted garment shapes or with jersey fabric. The fabric will stretch over the complex areas of the body (i.e. the bust) or areas of the body that have extreme movement (i.e. elbows).

The basic grid for knitwear can be used for designing shapes for hand or machine knitting. The examples show basic shapes, but far more complex shapes can be developed.

The basic grid

Note that this grid has no ease included; it is basic body measurements. Substantial extra ease must be added for movement and styling.

Measurements required to draft the block

The block can be drafted to size codes 8, 10, 12, etc, or to XSMALL, SMALL, MEDIUM, LARGE, XLARGE from any of the size charts in this book (pages 12–14). Personal measurements (see page 178) can also be applied to the block.
A size MEDIUM from the size chart on page 12 (for fashion garments) is used for this illustrated example.

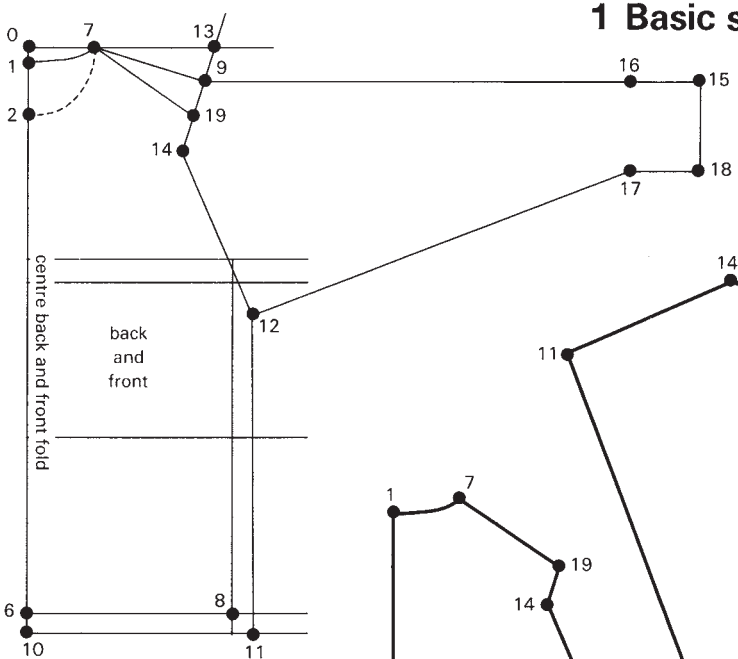
bust	88 cm	neck size	37 cm
nape to waist	41 cm	sleeve length	
armscye depth	21 cm	(jersey)	54.5 cm
shoulder	12.2 cm	waist to hip	20.6 cm
back width	34.4 cm		

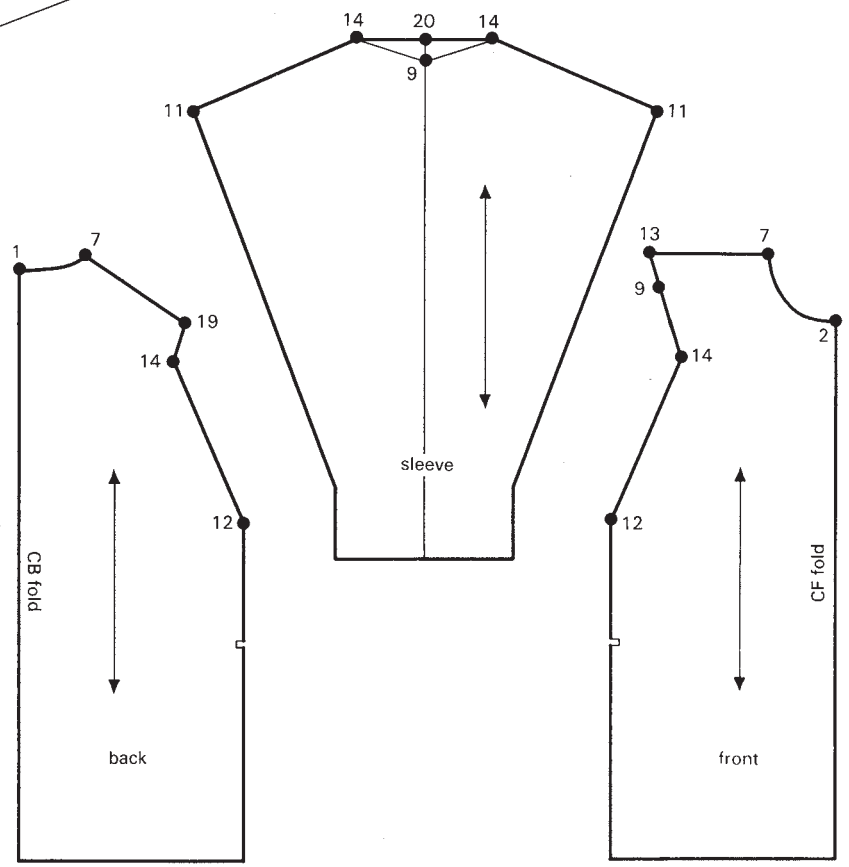
Body sections
Square down and across from 0.
0–1 1.5 cm.
0–2 one fifth neck size minus 0.2 cm.
1–3 armscye depth measurement; square across to mark armscye line.
3–4 2.5 cm; square across to mark bust line.
1–5 neck to waist measurement; square across to mark waistline.
5–6 waist to hip measurement; square across to mark the hipline.
0–7 one fifth neck size minus 0.2 cm; draw in back neck curve from 7–1; draw in front neck curve from 7–2.
6–8 quarter bust measurement; square up to the armscye.
Draw a line from 7 for the shoulder length measurement; construct the line at a 17° angle from the line from 0.
7–9 shoulder measurement.

1 Knitwear adaptation sleeve – basic shoulder

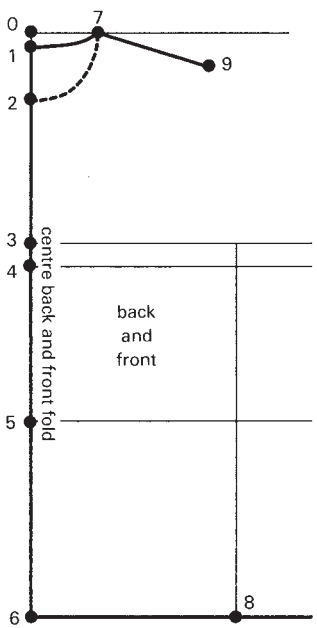
Trace the basic grid; mark points 0, 1, 2, 6, 7, 9.
Mark point 10 on the centre back line at required length; square across.
10–11 is one quarter chest plus the amount of ease and styling requirements; square up.
Mark point 12 at armscye depth required.
Square across both ways at 9, using the shoulder line to square from.
Mark point 13 where the 'square across line' meets the line from 0.
Draw a line, to create the armscye shape, from 12 to touch the 'squared across line'. Mark this point 14.
Square out from 9 the jersey sleeve measurement, to point 15.
15–16 = cuff depth.
16–17 = width required at the top of the sleeve rib; square across to 18. Join 17–12.
Fold the section 7, 13, 9 along the shoulder line; mark point 19.
Trace back using the shoulder line 7–19.
Trace front using the shoulder line 7–13.
Trace sleeve; mirror the sleeve on the centre line.
Join point 14 to 14.

1 Basic shoulder





Basic grid



2 Knitwear adaptation inset sleeve – extended shoulder

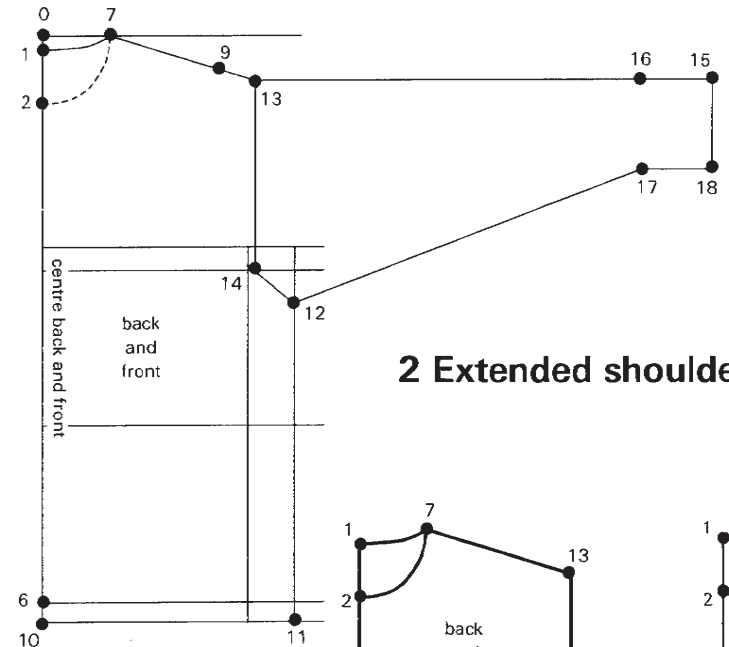
Trace the basic grid; mark points 0, 1, 2, 6, 7, 9.
Mark point 10 on the centre back line at required length; square across.
10–11 is one quarter chest plus the amount of ease and styling requirements; square up.
Mark point 12 at armscye depth required.
Extend the shoulder line to position required; mark point 13. Draw in armscye shape from 12–13 as required.
Square out from 13 the jersey sleeve measurement, minus the shoulder extension to point 15. Square down.
15–16 = cuff depth.
16–17 = width required at the top of the sleeve rib; square across to 18. Join 17–12.
Trace front, back and sleeve sections.

Note Some knitted garments do not have any armscye shaping. The body section side seam continues from 12 until it meets the extended shoulder seam. The sleeve is then drafted from this new point.
Note that this method produces a very dropped shoulder and surplus fabric in the area of the underarm.

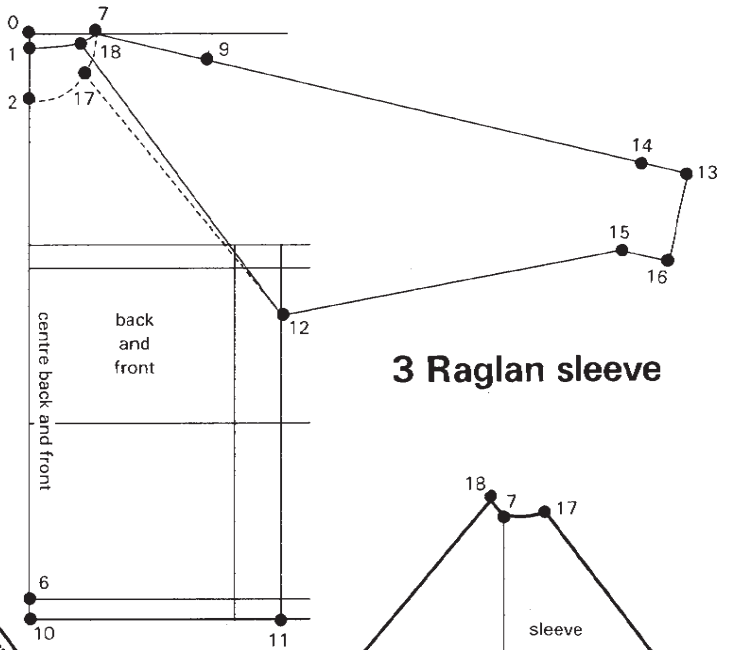
3 Knitwear adaptation raglan sleeve

Trace the basic grid; mark points 0, 1, 2, 6, 7, 9.
Mark point 10 on the centre back line at required length; square across.
10–11 is one quarter chest plus the amount of ease and styling requirements; square up.
Mark point 12 at armscye depth required.
Extend the shoulder line from 9, the jersey sleeve measurement, to point 13.
13–14 = cuff depth.
14–15 = width required at the top of the sleeve rib; square across to 16. Join 15–12.
Draw a line from the underarm point 12 to point 17 on the front neck.
Draw a line from the underarm point 12 to point 18 on the back neck.
Trace off front, back and sleeve sections as shown.
Mirror the front sleeve and place the sleeve sections together along the centre sleeve line.

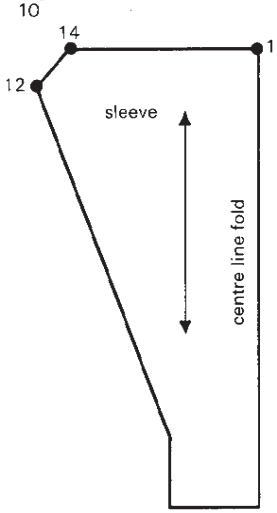
Note Although this section concentrates on the basic shaping, many variations of shape can take place by the use of varying stitches to create different types of fabric. This method can shape the garment internally. For example, moss stitch creates a flat fabric. This can be used with a form of ribbing that will shape the garment into the body.

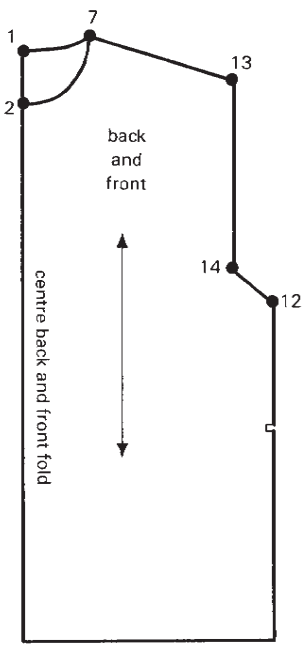


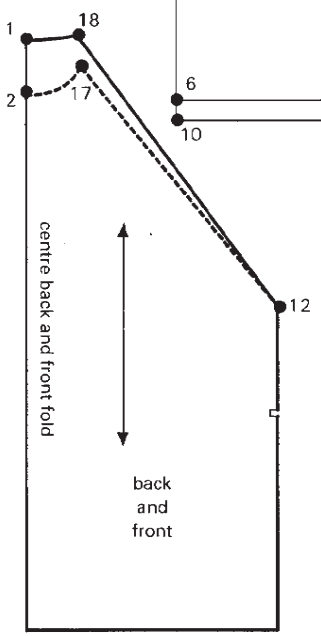
2 Extended shoulder

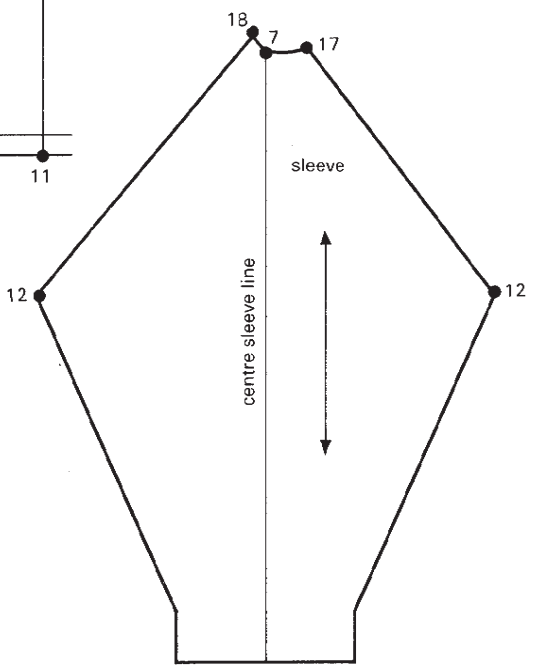


3 Raglan sleeve









Computers and knitted garment shapes

The knitting industry is now highly computerised. Many machines can knit garments that employ fashioning to create internal shaping. Firm and stable knitted fabric is used to construct this type of garment. Garments constructed in loose or unstable knitted fabric, or highly patterned fabric, usually rely on the classic, simple, knitted shapes shown on the previous pages. Manufacturers of cheaper knitwear, which is cut from 'body blanks' and then overlocked, also use simple shapes in order to minimise fabric wastage.

The craft knitting industry, which uses domestic knitting machines, is now creating adventurous shapes and designs. Computer programs, which are surprisingly inexpensive, are available. These programs offer basic shapes which can then be modified, or the program will allow you to create your own shapes. Some programs have a grading system for sizing as well as individual sizing.

PART TWO: FLAT CUTTING

11 Close fitting garments (stretch and jersey fabrics)

Close fitting body blocks *164*
Leggings block 164
1 Close fitting ribbed top 166
2 Basic cap sleeved tee 166
3 Sports skirt with pants 166
4 Stretch dress 166
Bodyshapers *168*
Swimwear *168*

The close fitting blocks are constructed to be smaller than the body measurements and to stretch to the body shape. Some adjustments to the horizontal measurements may have to be made (this should be related to the stretch and relaxation of different fabrics). For more technical information and block construction see Chapters 2 and 7 in *Fabric, Form and Flat Pattern Cutting* also by this author.

The sleeve measurement used is the jersey sleeve length, but this may still have to be adjusted to fabric stretch and relaxation properties.

Sizing

Sportswear and some casual wear manufacturers usually use sizing breaks of XSMALL, SMALL, MEDIUM, LARGE and XLARGE. The example sizings used in the following drafts are based on size MEDIUM, High-street fashion garments (see page 12).

Close fitting body blocks

These blocks are drafted for maximum stretch, fine ribbed jersey or Lycra fabrics. Extra ease needed for less flexible jersey fabrics is shown in brackets.

Measurements required to draft the block

The block can be drafted to size codes 8, 10, 12, etc, or to XSMALL, SMALL, MEDIUM, LARGE, XLARGE from any of the size charts in this book (pages 12–14). Personal measurements (see page 178) can also be applied to the block.
A size MEDIUM from the size chart on page 12 (for fashion garments) is used for this illustrated example.

bust	88 cm	neck size	37 cm
nape to waist	41 cm	armscye depth	21 cm
back width	34.4 cm	wrist	16 cm
sleeve length (jersey)	54.5 cm		

Body sections
Square down and across from 0.
0–1 neck to waist plus 1 cm (0.5 cm); square across.
0–2 finished length; square across.
0–3 armscye depth minus 3 cm (1 cm); square across.
0–4 half the measurement 0–3; square across.
0–5 one eighth the measurement 0–4; square across.
0–6 one sixth neck size (plus 1 cm); square up.
6–7 1.3 cm; draw in neck curve.
3–8 half back width minus 2.5 cm (1 cm); square up to 9 and 10.
10–11 1 cm; join 7–11.
3–12 quarter bust minus 3 cm (1 cm); square down to 13 on the waistline, 14 on the hemline.
Draw in armscye curve, from 11 through 9 to 12.
13–15 3 cm (2 cm); draw in side seam 12, 15, 14.
0–16 one sixth neck size minus 1 cm (0.5 cm); draw in front neck curve.
Back and front are the same except for front neck curve.

Sleeve
Square down from 17.
17–18 half the measurement 0–3 plus 1 cm (0.5 cm).
17–19 jersey sleeve length plus 4 cm (2 cm); square across.
17–20 the measurement of the diagonal line from 11–12 on body section plus 0.5 cm.
20–21 one third measurement 17–20.
Draw in sleeve head. Hollow the curve 0.6 cm from 20–21; raise the curve 2 cm from 17–21.
19–22 half wrist plus 0.5 cm (1 cm); join 20–22.

Short sleeve
17–23 sleeve length required; square across to 24.
24–25 1.5 cm; join 20–25 with a curve.

Leggings block

hips	94 cm
body rise	28 cm
waist to floor	104 cm
high ankle	21 cm

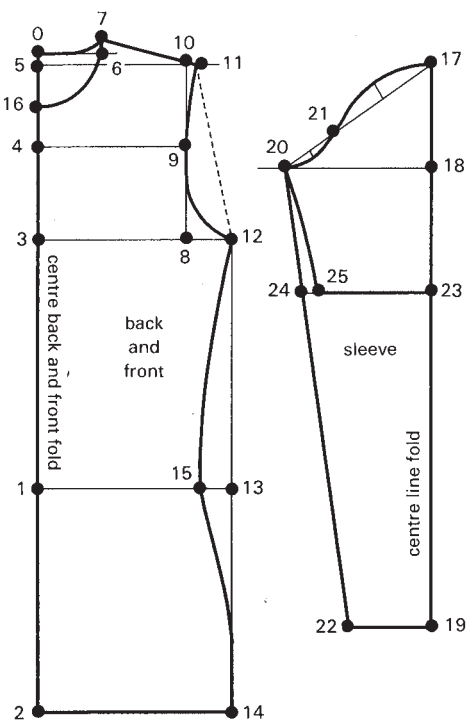
Front
Square down and across from 0.
0–1 body rise minus 1 cm; square across.
0–2 waist to floor minus 8 cm; square across.
1–3 half the measurement 1–2; square across.
1–4 quarter hip measurement minus 2 cm; square up to 5.
5–6 1 cm.
4–7 quarter the measurement 4–5.
4–8 one sixth the measurement 1–4.
Join 6–7 and 7–8 with a curve touching a point:
sizes 6–14 2.25 cm from 4
sizes 16–26 2.5 cm from 4
2–9 half high ankle measurement minus 0.5 cm.
3–10 two thirds the measurement 1–4 minus 0.5 cm.
Draw inside leg seam; join 9–10 with a straight line, join 8–10 curving the line inwards 0.75 cm.

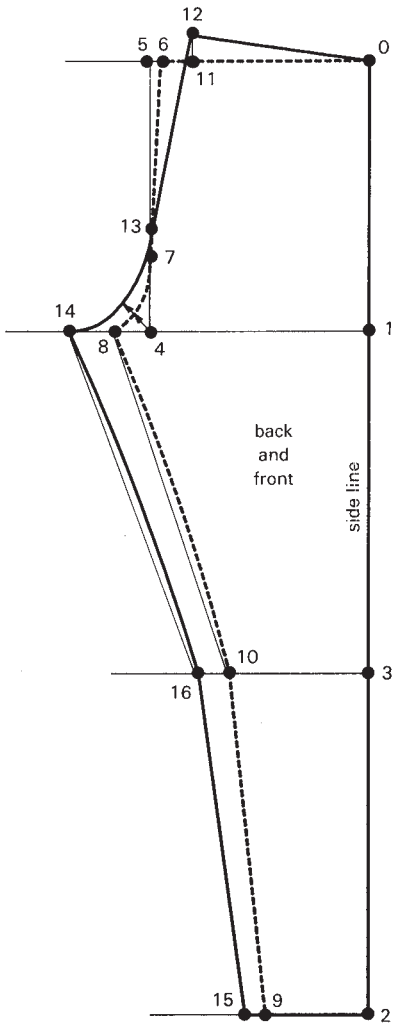
Back
5–11 4 cm.
11–12 3 cm; join 12–0.
4–13 one third measurement 4–5.
8–14 one fifth measurement 1–4.
Join 12–13 and 13–14 with a curve touching a point:
sizes 6–14 3.75 cm from 4
sizes 16–26 4 cm from 4
9–15 2 cm
10–16 3 cm.
Draw inside leg seam; join 15–16 with a straight line, join 14–16, curve the line inwards 0.75 cm.

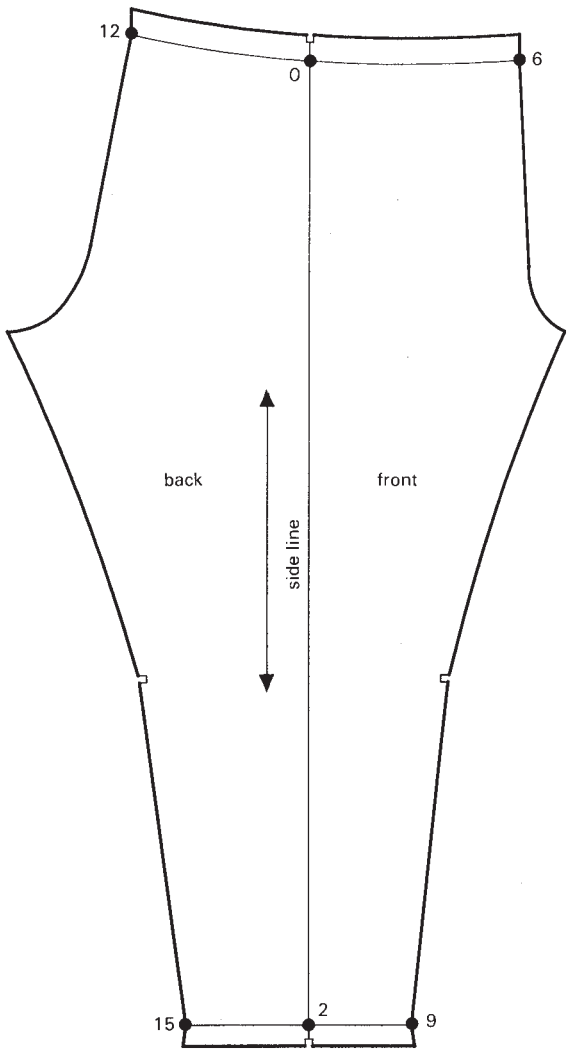
Creating a one-piece pattern
Trace round back section (heavy line).
Trace round front section (dotted line).
Mirror the front and place the side seams together.
Add 2.5 cm facing at the top, 2 cm facing at the hem.

Leggings

Close fitting body block

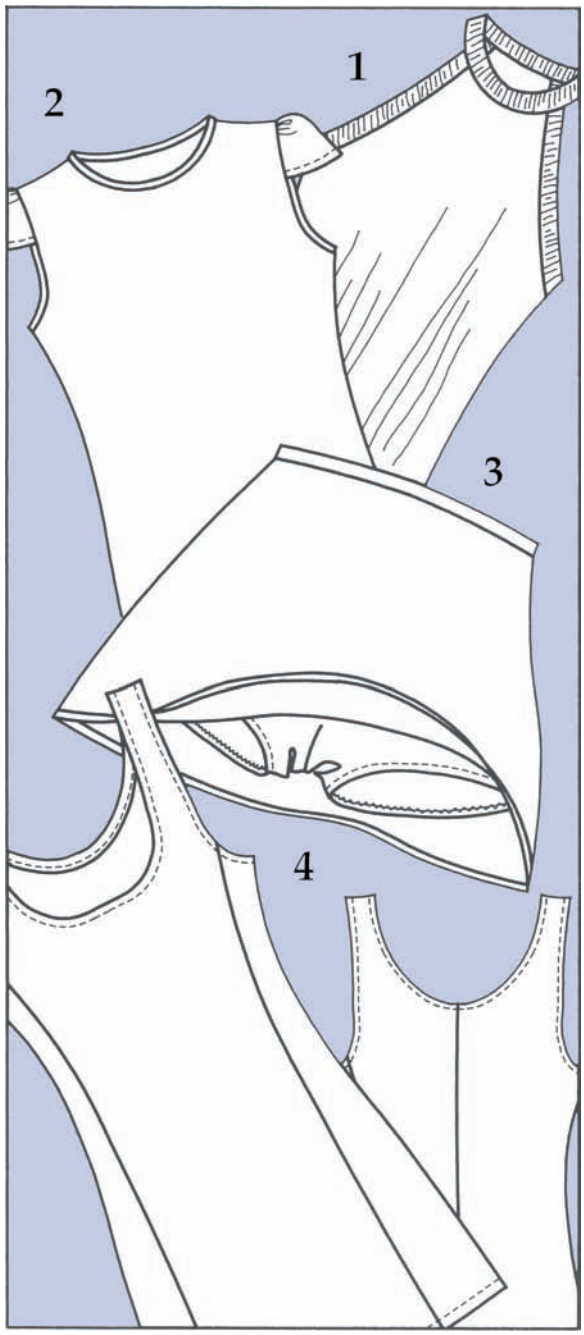






1 *Close fitting ribbed top*

Trace off the block for maximum stretch fabric to the required length.
Back and front sections Draw in the lowered neckline and cut-away armscye line. Draw in the width of ribbed edging around the neck and sleeves. Trace off the back and front sections.



2 *Basic cap sleeved tee*

Trace off the block for less flexible jersey fabric to the required length.
Back and front sections Draw in lowered neckline as required.
Sleeve Draw in the cap section on the sleeve.
Mark points 1 and 2. Measure the length.
Measure the same length on the bodice armscye point 3–4. Mark a notch at point 4.
Trace off the top cap section of the sleeve. Divide into four sections.
Draw a vertical and horizontal line.
Cut and open the sections as shown.
Trace round the new sleeve shape.

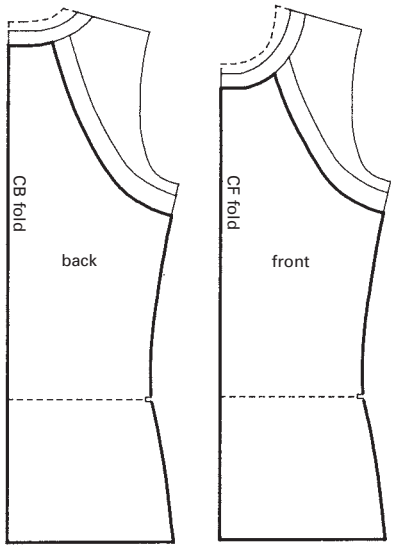
3 *Sports skirt with pants*

Back and front skirt Square out and down from 0.
0–1 waist to hip minus 6 cm.
0–2 skirt length.
1–3 quarter hip measurement minus 1 cm.
Square down to 4.
0–5 quarter waist measurement plus 1.5 cm.
5–6 1 cm; draw in waist curve.
4–7 2 cm; join 3–7. Join 3–6 with a curve.
Draw a vertical line from the centre of the waistline to the hem.
Cut and open at the hem approx. 3.5 cm.
Pants Square down from 0.
0–1 waist to hip minus 6 cm; square out.
0–2 body rise minus 5.5 cm; square out.
1–3, 1–4 quarter hip measurement minus 3.5 cm.
Square up to 5 and 6, and down to 7 and 8.
5–9 2 cm. Join 3–9.
7–10 quarter 1–3 plus 1cm; join 3–10 with a curve.
10–11 5 cm.
11–12 2.5 cm; join 10–12.
6–13 1 cm; join 0–13.
8–14 3.25 cm; square out.
14–15 quarter 2–8 plus 2.5 cm; join 4–15 with a curve.
15–16 5 cm.
16–17 2.5 cm; draw leg curve 17, 2, 12.

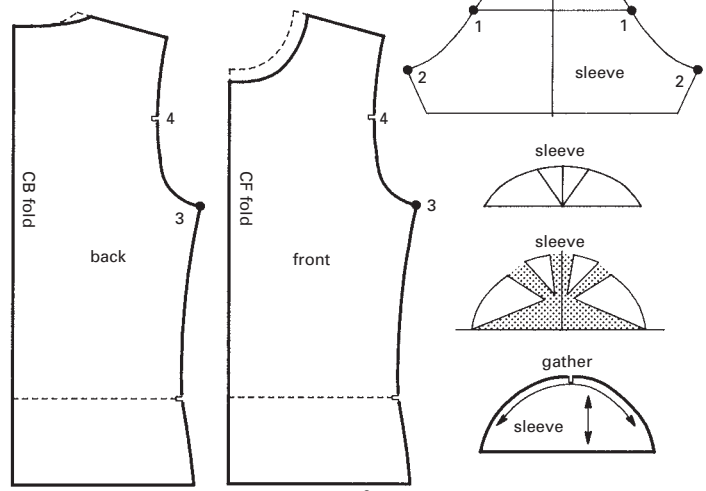
4 *Stretch dress*

Trace off the block for less flexible jersey fabric to the required length.
Back and front sections Draw in lowered neckline as required. Draw in armscye line.
Draw in front panel line.
Trace off back and front sections.
Back Shape waist in 1 cm at a point 2 cm below the natural waistline. Add 1.5 cm flare to hem.
Front Shape waist 0.5 cm. Add 1.5 cm flare to hem.
Cut and overlap the neckline 0.5 cm.
Side panel Shape waist in 1 cm. Add 1.5 cm flare to hem.

1 Close fitting ribbed top

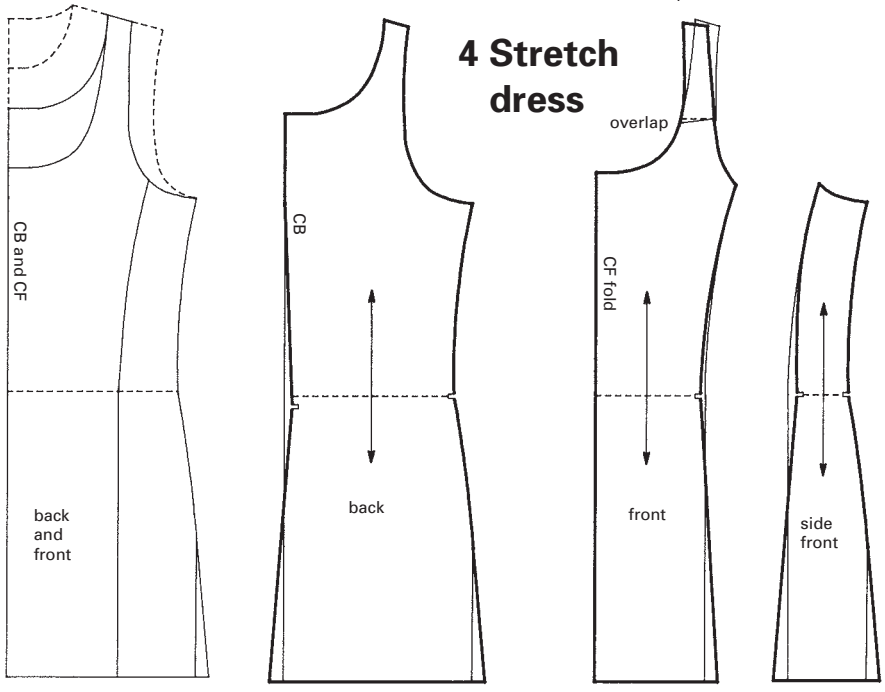


2 Basic cap sleeved tee



3 Sports skirt with pants

4 Stretch dress



Bodyshapers

Measurements required to draft the block

The block can be drafted to size codes 8, 10, 12, etc, or to XSMALL, SMALL, MEDIUM, LARGE, XLARGE from any of the size charts in this book (pages 12–14). Personal measurements (see page 178) can also be applied to the block.
A size MEDIUM from the size chart on page 12 (for fashion garments) is used for this illustrated example.

bust	88 cm	neck size	37 cm
nape to waist	41 cm	sleeve length	
armscye depth	21 cm	(jersey)	54.5 cm
back width	34.4 cm	wrist	16 cm

Back
Square down and across from 0.
0–1 neck to waist plus 1 cm; square across.
1–2 body rise; square across.
0–3 armscye depth plus 1.5 cm; square across.
0–4 half the measurement 0–3; square across.
0–5 one fifth the measurement 0–4; square across.
0–6 one sixth neck size; square up.
6–7 1.5 cm; draw in neck curve.
3–8 half back width minus 0.5 cm; square up to 9 and 10.
10–11 1 cm; join 7–11.
3–12 quarter bust minus 1.5 cm; square down to 13 on the waistline, 14 on the body rise line.
Draw in armscye curve, from 11 through 9 to 12.
1–15 quarter measurement 1–2; square across to 16.
16–17 3 cm.
13–18 4.25 cm. Draw in side seam.
2–19 one eighth bust measurement plus 1 cm; square across 3.5 cm to 20.
2–21 square out 6 cm for gusset line; join 21–17.
Draw in back leg; curve line 21–17 outwards 0.5 cm.
Draw in gusset curve; curve line 20–21 inwards 0.3 cm.
Trace off gusset. Draw a curved line from 21 to a point 0.5 cm above 2. Add 2 cm to the line 19–20.

Front
0–22 one sixth neck size minus 1 cm; draw in front neck curve.
2–23 half the measurement 2–19; square across 2 cm to 24; square up 2 cm to 25; join 25–17.
25–26 half the measurement 25–17.
Draw in front leg; curve line inwards 1.75 cm at 26.

Sleeve
Square down from 27.
27–28 half the measurement 0–3 plus 1 cm.
27–29 jersey sleeve length plus 3 cm; square across.
27–30 the measurement of the diagonal line from 11–12 on body section plus 0.5 cm.
30–31 hollow the curve 0.6 cm.
31–27 raise the curve 2 cm.
29–32 half wrist plus 0.5 cm; join 30–32 with a curve.

Short sleeve
27–33 sleeve length required; square across to 34.
34–35 1.5 cm; join 30–35 with a curve.

Sleeveless bodyshaper
12–36 2.5 cm.
11–37 4.5 cm; draw in new armscye curve 36–37.

Swimwear – basic shape

See diagram on page 170.

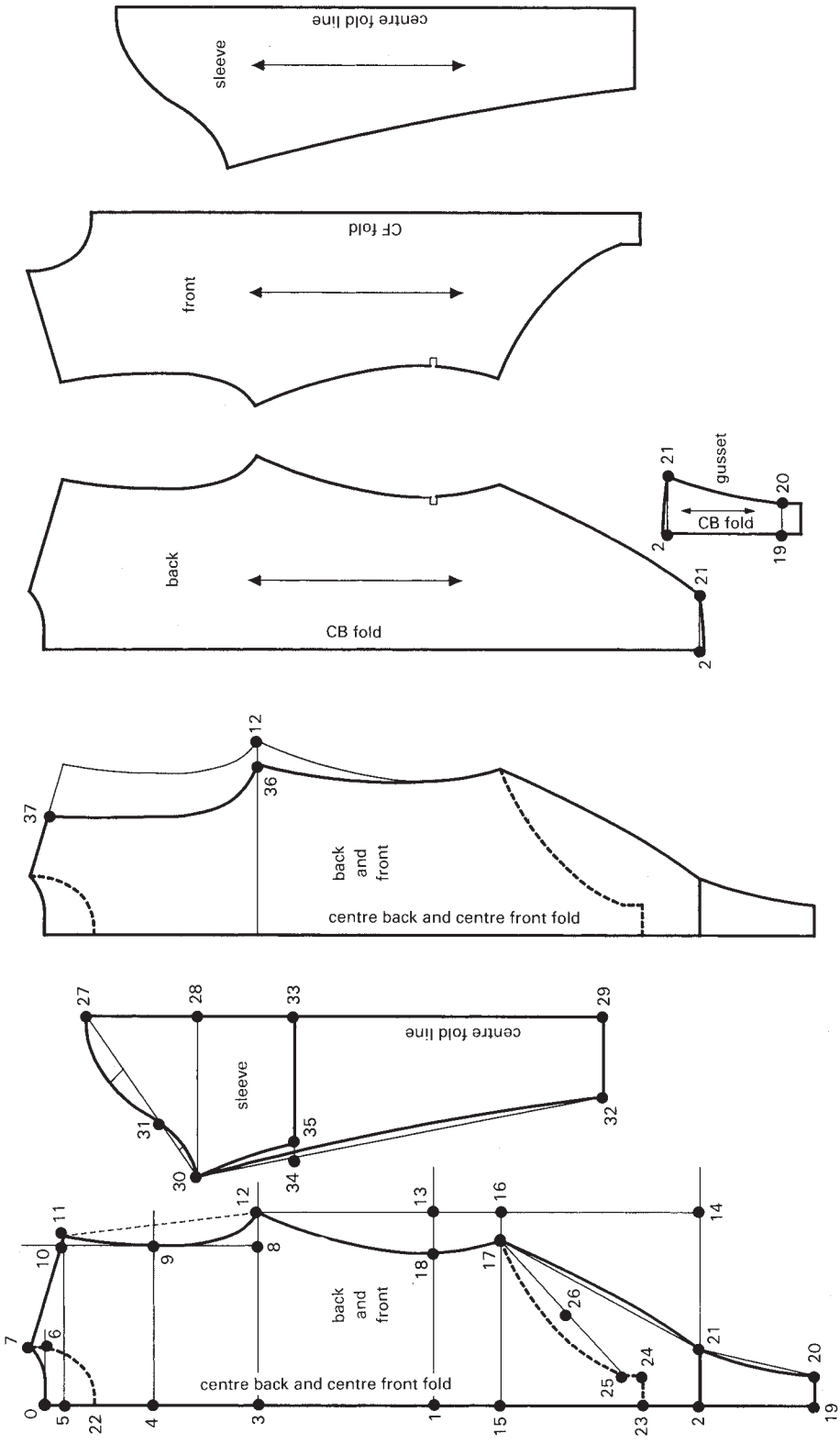
Back
Construct swimwear block as for bodyshaper block up to point 7.
3–8 half back width minus 4.5 cm; square up to 9 and 10 on the line from 0. Join 7–10.
3–11 quarter bust minus 4 cm; square down to 12 on the waistline, 13 on the body rise line.
Draw in armscye curve, from 10 through 9 to 11.
1–14 quarter measurement 1–2; square across to 15.
15–16 0.5 cm.
12–17 2 cm. Draw in side seam.
2–18 6 cm; join 16–18.
Draw in back leg; curve line 16–18 outwards 0.5 cm.
Lower bottom curve from 18 to 0.5 cm below point 2.

Front
3–19 half measurement 3–4. Draw front neck curve.
2–20 one sixteenth bust measurement plus 0.5 cm; square across 3.5 cm to 21. Square up 2 cm to 22. Join 16–22.
22–23 half the measurement 16–22.
Draw in front leg; curve line inwards 1.75 cm at 23.
2–24 measurement 2–20; square out 6 cm to 25.
Curve line 21–25 inwards 0.3 cm.
Lower bottom curve from 25 to 0.5 cm below point 24.

Swimwear – bra top

Trace off the front block, mirror front as shown.
3–26 half measurement 3–11 minus 2 cm; join 7–26.
Swing a line, the length of 7–25, to create a 10 cm dart at 26. Mark point 27.
Draw a line 4 cm long to touch the line from 5 at 28.
Draw in armscye line 11–28.
Draw in bra shape, draw neckline and seam line in bra cup.
Trace off top and bottom sections of the bra.
Close the dart in the top section.
Redraw bottom line and neckline if distorted.

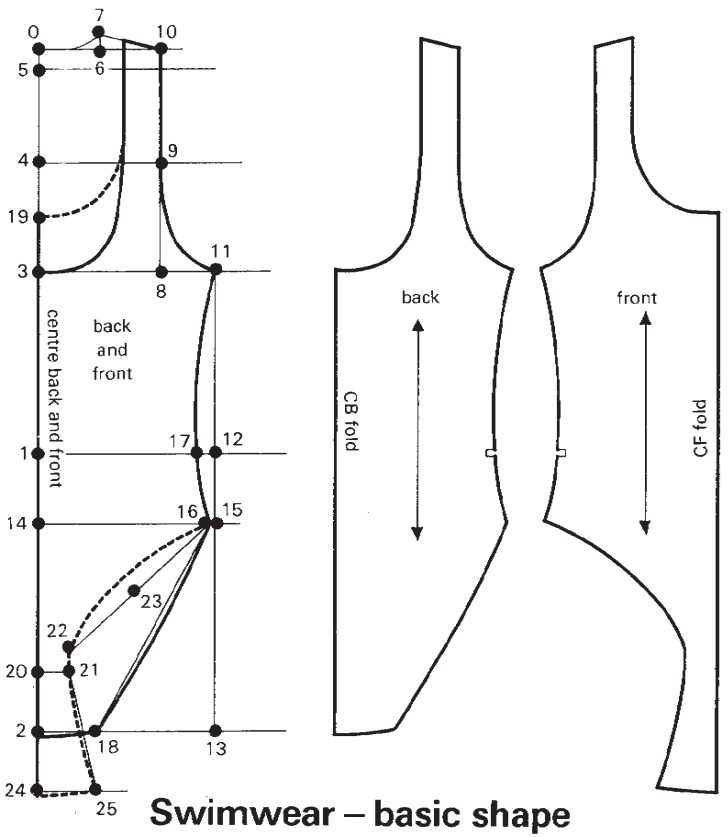
Bodyshaper


centre fold line
sleeve
CF fold
front
back
CB fold
gusset
CB fold
back and front
centre back and centre front fold
centre fold line
sleeve
back and front
centre back and centre front fold

Larger cup size

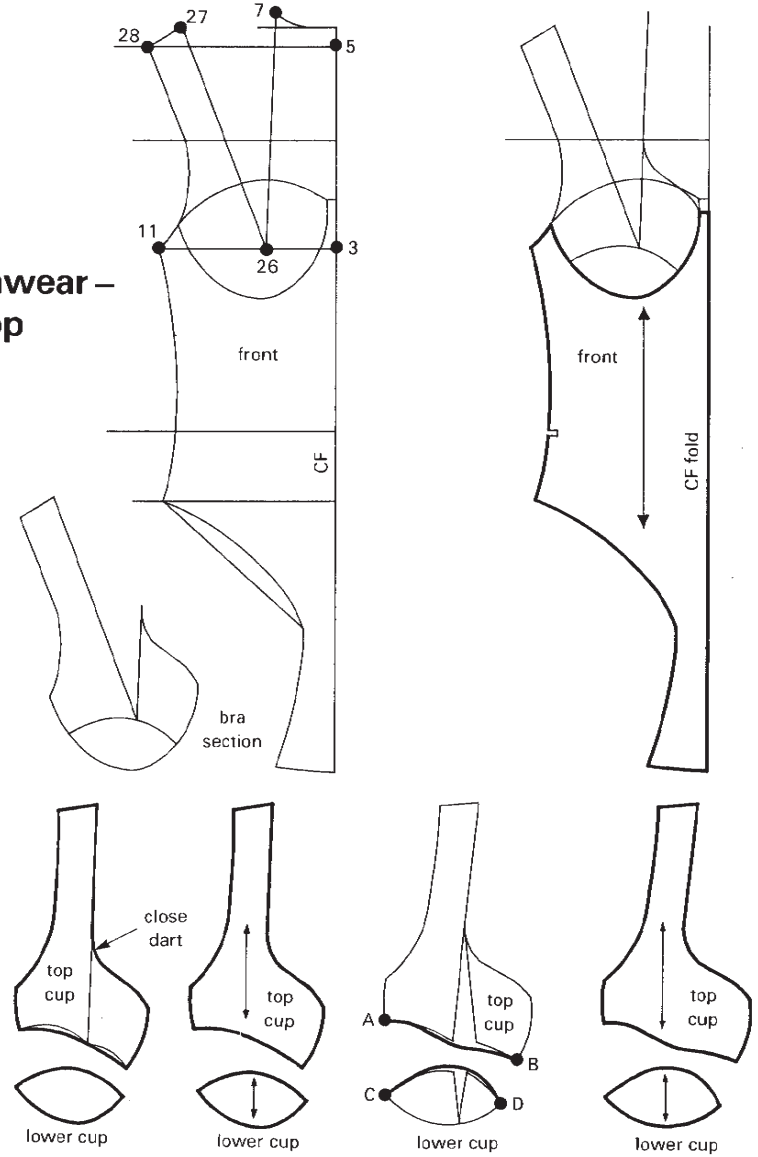
Lower section
Draw a vertical line through the lower cup from bust point on top edge the required amount (example shows 1.5 cm). Raise curve of top edge 0.5 cm.

Top section
Open dart line at the lower edge the same amount as the lower cup plus 1 cm. Reshape lower edge as shown; ensure that the length A–B = C–D on the lower cup.



Swimwear – basic shape

Swimwear – bra top



PART THREE: SIZE AND FIT

12 Basic grading techniques

Grading patterns 172
Grading four sizes 172
Grading one size up – form cutting 172
Grading one size up – flat cutting 175

Special notes

Many students find grading a difficult subject. Therefore, as this is an introductory book to pattern cutting, examples are demonstrated using simple size charts.

Grading for *form cutting* in this chapter is based on the Body measurement chart for High-street fashion garments (code sizes **6–16**) on page 12. The chart has 4 cm intervals and an even grade between all sizes.
Grading for *flat cutting* in this chapter is based on the Body measurement chart for High-street fashion garments (sizes **XS**, **S**, **M**, **L**, **XL**) on page 12. The chart has 6 cm intervals and an even grade between all sizes.

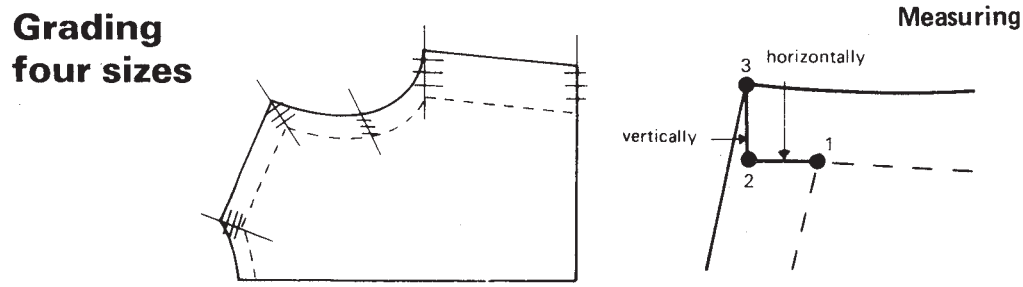
Grading patterns

Pattern grading is a technique used to reproduce a pattern in other sizes. It must be done accurately; small errors unnoticed when one size is graded become difficulties when many sizes are required. An accurate method is to draft the smallest size and the largest size, then stop off the sizes between on lines drawn through the basic points (see diagram).

Many manufacturers are now using computers to grade patterns, but it is useful for students to understand the principle of how the data used is calculated. Once the basic principle is learnt, one can understand any new method quickly. Manual methods usually 'shift' the whole pattern horizontally and then vertically.

The method shown in this book is used in computer grading; points for the next size up are established by measuring distances horizontally then vertically. The new pattern outline is then drawn between the points.

Example – grading one size up (see diagram)
From base 1 on the shoulder point, square across. Measure horizontally the required measurement; mark point 2.
Square up; measure vertically the required measurement to point 3.
Point 3 is the new shoulder point for the next size.



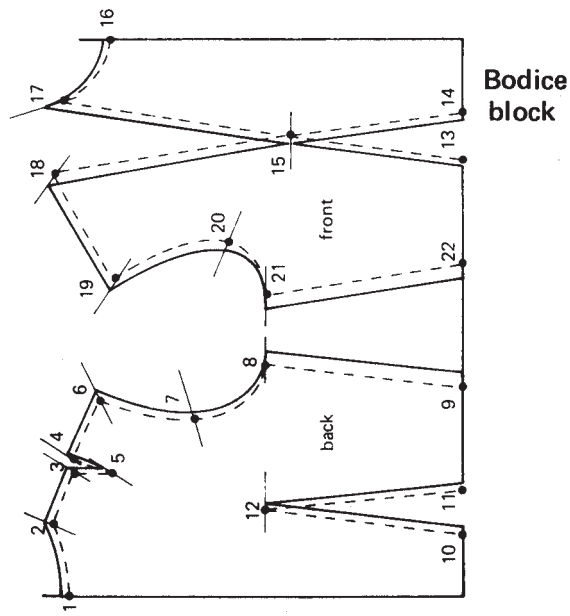
Grading one size up – *form cutting* (4 cm intervals) – 1

Body measurement chart for High-street fashion garment code sizes 6–16, page 12.

The close fitting bodice block

Back
1 measure 4 mm hor.
2 measure 4 mm hor. 2 mm vert.
3, 4, 5 measure 3.5 mm hor. 3 mm vert.
6 measure 3 mm hor. 4.5 mm vert.
7 measure 2 mm hor. 5 mm vert.
8, 9 measure 8.5 mm vert.
10, 11, 12 measure 2.5 mm vert.

Front
13, 14, 15 measure 4.5 mm vert.
16 measure 2 mm hor.
17 measure 4 mm hor. 2 mm vert.
18 measure 4 mm hor. 8 mm vert.
19 measure 3 mm hor. 11 mm vert.
20 measure 1 mm hor. 8 mm vert.
21, 22 measure 11.5 mm vert.

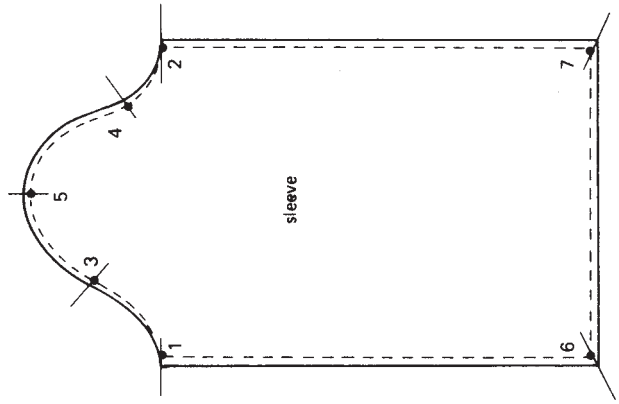


Grading one size up – *form cutting* (4 cm intervals) – 2

Body measurement chart for High-street fashion garments code sizes 6–16, page 12.

Sleeve block

Sleeve block

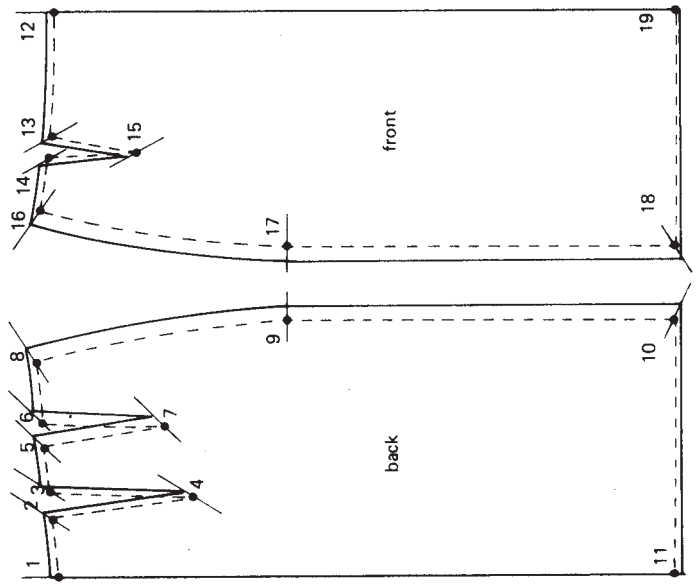


Sleeve

1 measure 4 mm vert.
2 measure 5 mm vert.
3 measure 2 mm hor. 0.5 mm vert.
4 measure 1 mm hor. 0.5 mm vert.
5 measure 4 mm hor.
6 measure 1 mm hor. 4 mm vert.
7 measure 1 mm hor. 5 mm vert.

Tailored skirt block

Tailored skirt block



Points 10, 11, 18, 19 are graded to knee length, adjust as required.

Back

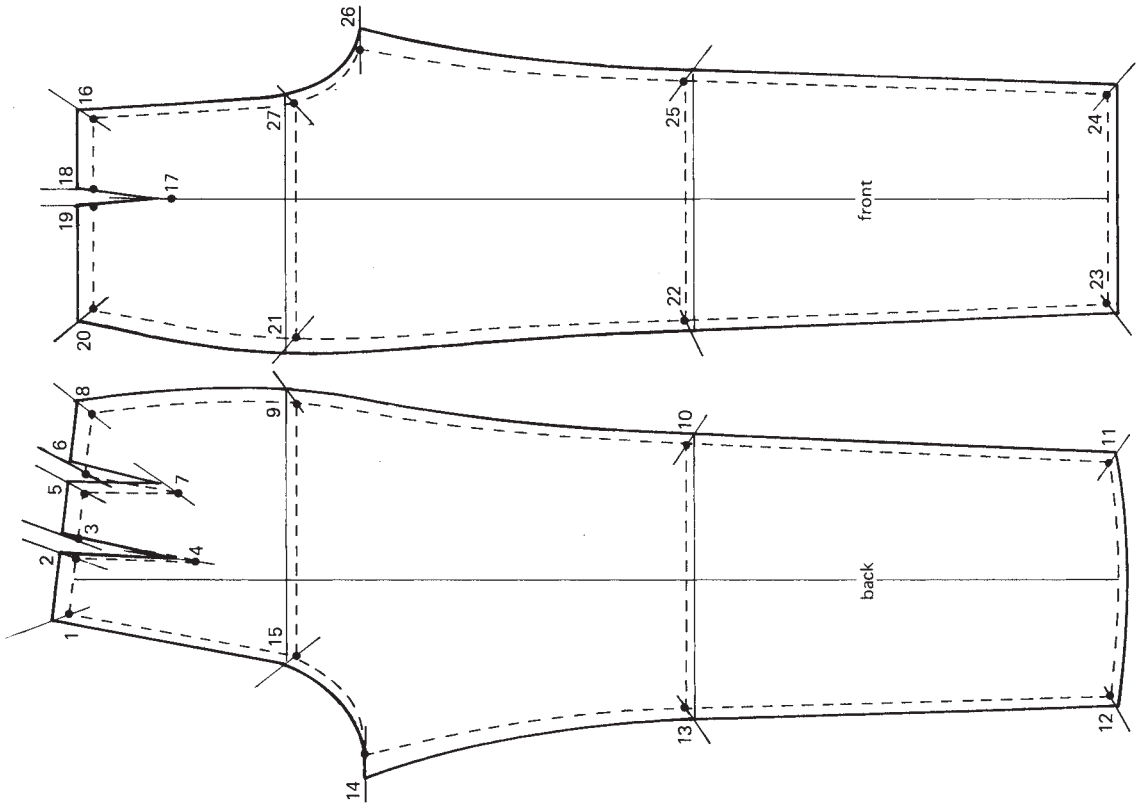
1 measure 3 mm hor.
2, 3, 4 measure 3 mm hor. 3 mm vert.
5, 6, 7 measure 3 mm hor. 6 mm vert.
8 measure 3 mm hor. 10 mm vert.
9 measure 10 mm vert.
10 measure 5 mm hor. 10 mm vert.
11 measure 5 mm hor.

Front

12 measure 3 mm hor.
13, 14, 15 measure 3 mm hor. 6 mm vert.
16 measure 3 mm hor. 10 mm vert.
17 measure 10 mm vert.
18 measure 5 mm hor. 10 mm vert.
19 measure 5 mm hor.

Grading one size up – *form cutting* (4 cm intervals) – 3

Body measurement chart for High-street fashion garments code sizes 6–16, page 12.



The classic tailored trouser block

Back

1 measure 7 mm hor. 3 mm vert.
2, 3, 4 measure 7 mm hor. 1 mm vert.
5, 6, 7 measure 7 mm hor. 4 mm vert.
8 measure 7 mm hor. 7 mm vert.
9 measure 4 mm hor. 7 mm vert.
10 measure 1.5 mm hor. 3 mm vert.
11, 12 measure 3 mm hor. 2.5 mm vert.
13 measure 1.5 mm hor. 3 mm vert.
14 measure 8 mm vert.
15 measure 4 mm hor. 3 mm vert.

Front

16 measure 7 mm hor. 3 mm vert.
17, 18, 19 measure 7 mm vert.
20 measure 7 mm hor. 7 mm vert.
21 measure 4 mm vert. 7 mm vert.
22 measure 1.5 mm hor. 3 mm vert.
23, 24 measure 3 mm hor. 2.5 mm vert.
25 measure 1.5 mm hor. 3 mm vert.
26 measure 6 mm vert.
27 measure 4 mm hor. 3 mm vert.

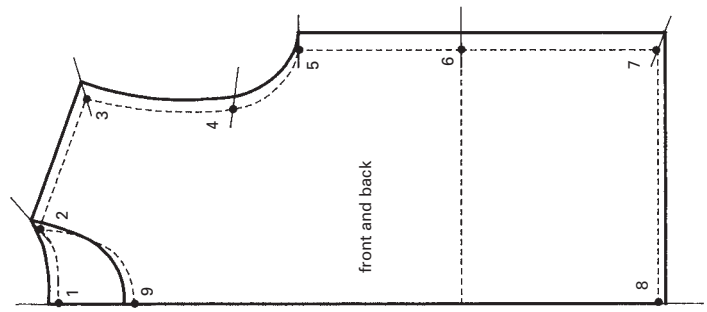
Grading one size up – *flat cutting* (6 cm intervals) – 1

Body measurement chart for High-street fashion garment sizes XS, S, M, L, XL, page 12.

Flat bodice blocks

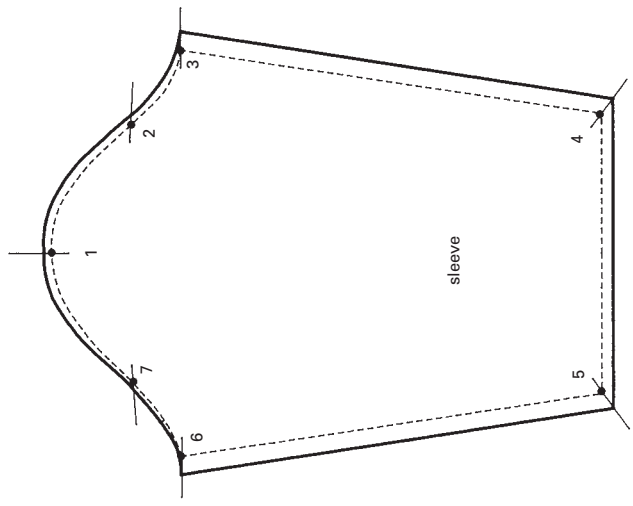
Back and front

1 measure 6 mm hor.
2 measure 6 mm hor. 3 mm vert.
3 measure 5.5 mm hor. 7.5 mm vert.
4 measure 2 mm hor. 9.5 mm vert.
5, 6 measure 15 mm vert.
7 measure 4 mm hor. 15 mm vert.
8 measure 4 mm hor.
9 measure 3 mm hor.



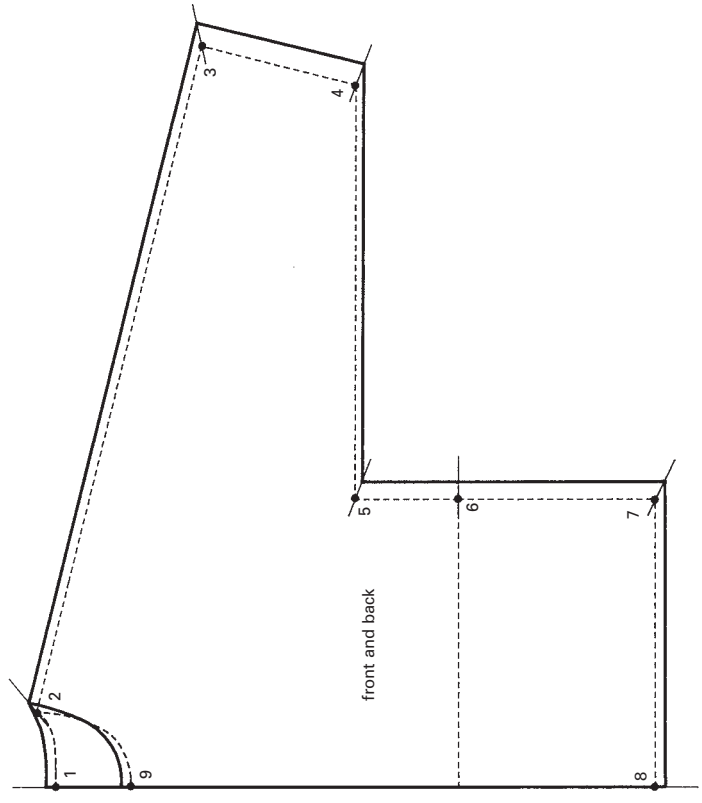
Sleeve

1 measure 3 mm hor.
2 measure 1 mm hor. 6.5 mm vert.
3 measure 10 mm vert.
4, 5 measure 7 mm hor. 6.5 mm vert.
6 measure 10 mm vert.
7 measure 1 mm hor. 6.5 mm vert.



Flat kimono block

1 measure 6 mm hor.
2 measure 6 mm hor. 3 mm vert.
3 measure 5.5 mm hor. 15 mm vert.
4 measure 1.5 mm hor. 13.5 mm vert.
5 measure 1.5 mm hor. 15 mm vert.
6 measure 15 mm vert.
7 measure 4 mm hor. 15 mm vert.
8 measure 4 mm hor.
9 measure 3 mm hor.



Grading one size up – *flat cutting* (6 cm intervals) – 2

Body measurement chart for High-street fashion garment sizes XS, S, M, L, XL, page 12.

Flat trouser block

Back

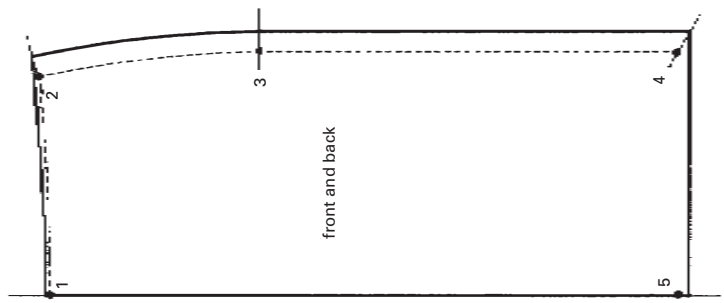
1 measure 10 mm hor. 4 mm vert.
2 measure 10 mm hor. 11 mm vert.
3 measure 6 mm hor. 11 mm vert.
4 measure 2.5 mm hor. 3 mm vert.
5, 6 measure 5 mm hor. 3 mm vert.
7 measure 2.5 mm hor. 3 mm vert.
8 measure 10 mm vert.
9 measure 6 mm hor. 4 mm vert.

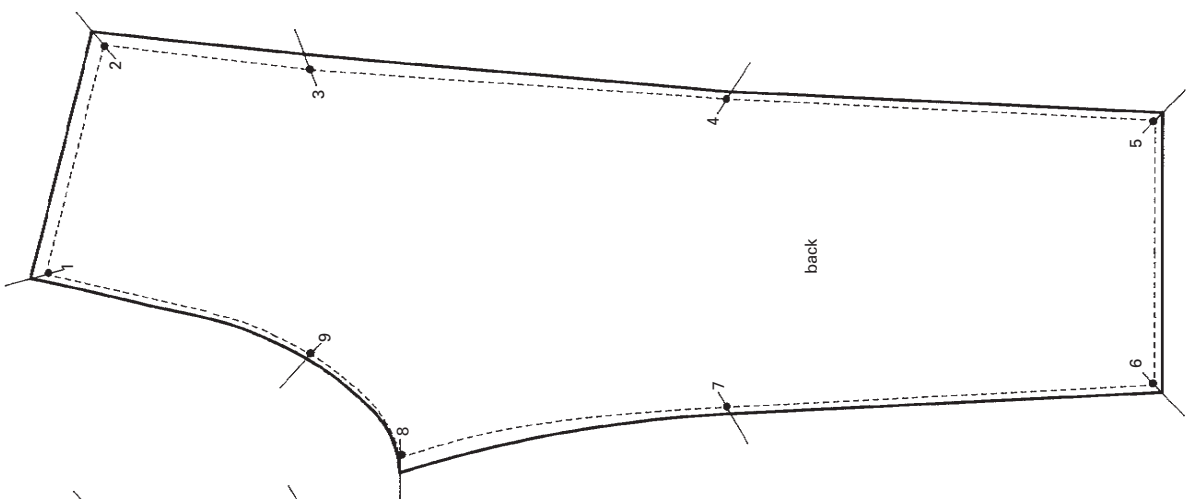
Front

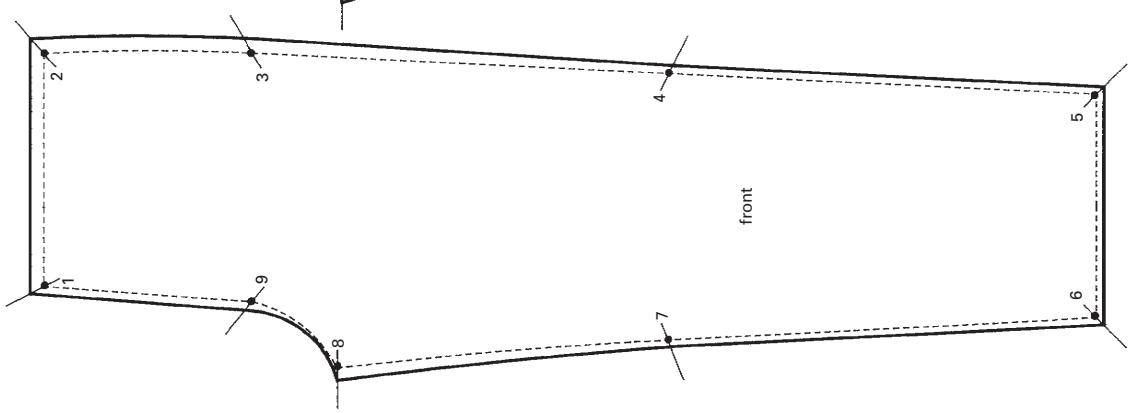
1 measure 10 mm hor. 5 mm vert.
2 measure 10 mm hor. 10 mm vert.
3 measure 6 mm hor. 10 mm vert.
4 measure 2.5 mm hor. 3 mm vert.
5, 6 measure 5 mm hor. 3 mm vert.
7 measure 2.5 mm hor. 3 mm vert.
8 measure 8 mm vert.
9 measure 6 mm hor. 5 mm vert.

Flat and very flat skirt block

1 measure 4 mm hor.
2 measure 4 mm hor. 15 mm vert.
3 measure 15 mm vert.
4 measure 7 mm hor. 15 mm vert.
5 measure 7 mm hor.







PART THREE: SIZE AND FIT

13 Drafting blocks and fitting for individual figures

Drafting blocks for individual figures 178
Taking measurements 178
Making toiles 180
Pattern alterations for fitting figure problems 181

Drafting blocks for individual figures

Drafting blocks for an individual figure is a simple operation. Use the instructions for the basic blocks (Chapter 1) but use personal measurements instead of the standard body size chart.

Take the bust measurement. Unless this measurement is very large in proportion to the rest of the figure, the bust measurement determines the drafting size. Example bust 104 cm = size 20.

Note For a very large bust or for a 'dowager hump' back see page 186 before beginning the draft.

Copy the size chart shown below. Fill in the measurements shown in normal type from the size chart for standard body measurements on page 13. For a bust size of 103.5 cm use those required for a size 20. All measurements shown in bold type are those taken from the individual figure and then written on the chart.

It is a good idea to list the standard measurements at the side to compare them. If there are wide differences, the figure should be remeasured at these points and checked to see if it is in fact much wider or narrower than a normal figure.

	Personal measurements	Standard measurements	Comments on figure
1. Bust	**103.5**	104	nearest size
2. Waist	**90**	88	larger waist
2a. Low waist	100	98	larger low waist
3. Hips	**114**	112	larger hips
4. Back width	**38.4**	38.4	
5. Chest	**37.2**	37.2	
6. Shoulder	**13.6**	13.25	wider shoulders
7. Neck size	**41**	41	
8. Dart	9.4	9.4	
9. Top arm	**32.2**	33.2	slimmer arm
10. Wrist	**17.5**	18	slimmer wrist
11. Ankle	**25.9**	26	slimmer ankle
12. High ankle	**22.9**	23	
13. Nape to waist	**43.5**	42.6	longer back waist meas.
14. Front shoulder to waist	**46**	44.1	longer front waist meas.
15. Armscye depth	23.5	22.6	
16. Skirt length	**71**		finished skirt length
17. Waist to hip	21.8	21.8	
18. Waist to floor	**110**	108	extra length
19. Body rise	**32.5**	30.8	longer body rise
20. Sleeve length	**61.5**	60.25	longer arm

Extra measurements (garments): these are standard measurements (see page 13).

Taking measurements

For extra guidance use the following instructions and the diagram opposite.

1 Bust Measure the figure at the fullest point of the bust, do not allow the tape to fall at the back.

2 Waist Take this measurement round the waist, make sure it is comfortable.

After taking the waist measurement tie a string firmly round the waist: this allows the vertical measurements to be taken accurately.

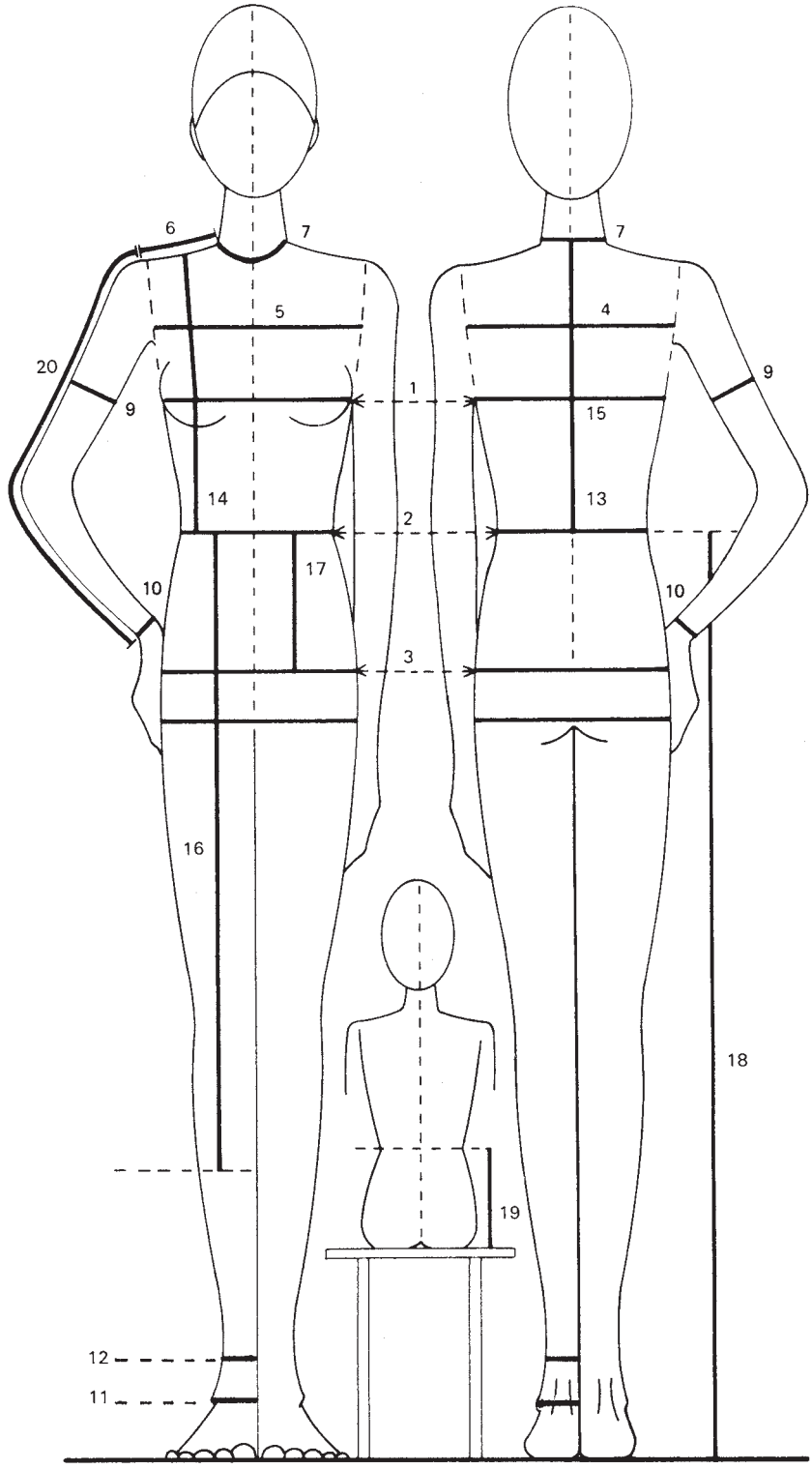
2a Low waist Take the low waist measurement 6 cm below the natural waistline.

3 Hips Measure the widest part of the hips approx. 21 cm from the waistline. For hips that differ from standard measurement (hips 5 cm larger than bust) see page 188 for dress blocks.

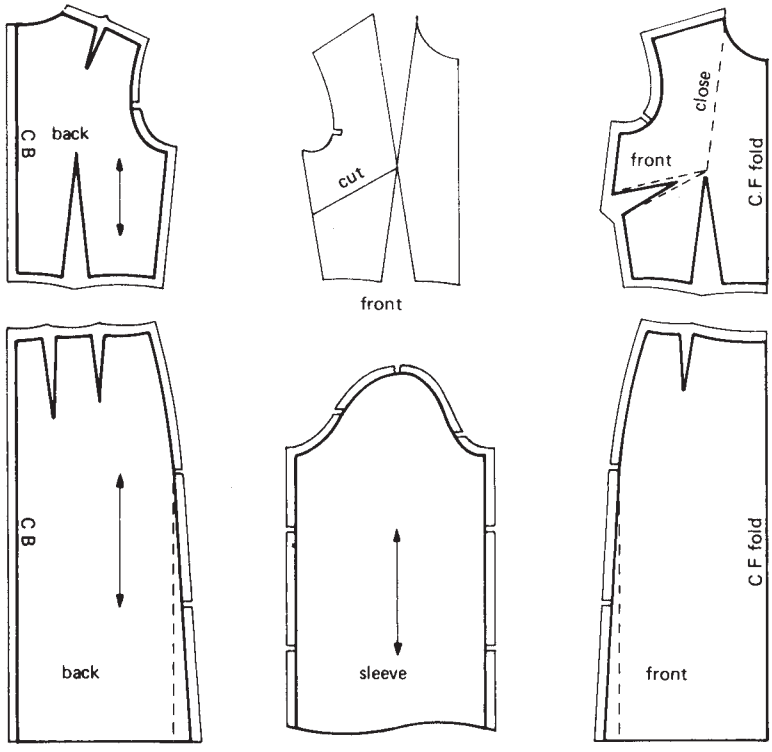
4 Back width Measure the back width 15 cm down from the neck bone at the centre back. Measure from armscye to armscye.

5 Chest Measure the chest 7 cm down from the neck point at the centre front (armscye to armscye).
6 Shoulder Measure from the neck to the shoulder bone.
7 Neck size Measure the base of neck touching front collar bone.
8 Dart Standard measurement.
9 Top arm The arm must be bent, measure the biceps.
10 Wrist Take the wrist measurement with slight ease.
11 Ankle Measure around the ankle over ankle bone.
12 High ankle Measure around leg just above the ankle.
13 Nape to waist Measure from the neck bone at the centre back to the string tied around the waist.
14 Front shoulder to waist Measure from the centre of the front shoulder over the bust point to waist.
15 Armscye depth Standard measurement.
16 Skirt length Measure the skirt length from the string at the waist down to the required hem length.
Note Measure from the waist to floor at the back and front to check that the balance of the figure is even.
17 Waist to hip Standard measurement.
18 Waist to floor Measure from waist to floor at the centre back.
19 Body rise The subject should sit on a hard chair. Take the measurement at the side from the waist to the chair.
20 Sleeve length Place the hand on hip so that the arm is bent. Measure from the shoulder bone over the elbow to the wristbone above the little finger.

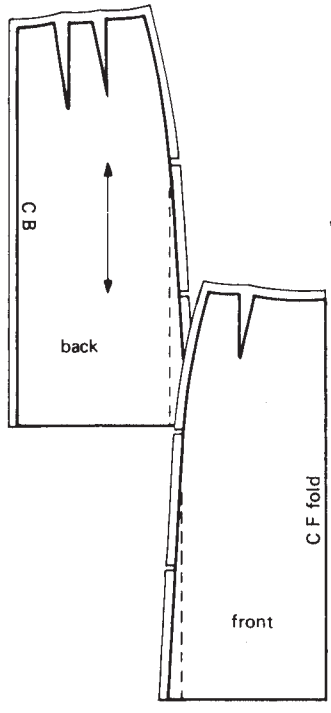
The list of individual measurements should be carefully checked against the list of standard measurements and any great deviation accounted for. The blocks can then be drafted using the person's *individual* measurements. If a figure fault is very pronounced consult the following section and adapt the block before making the toile.



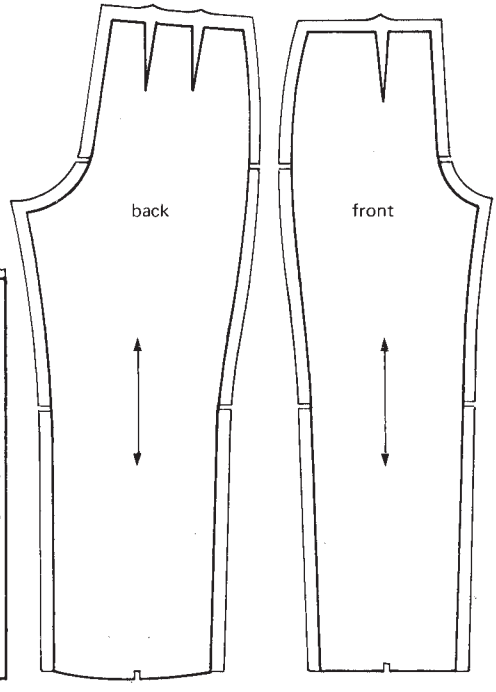
The two-piece dress block



The tailored skirt block



Classic tailored trouser block



Making toiles

The basic blocks must fit perfectly, therefore it is necessary to make them up into calico toiles to check the fit. Examples are given for making up the toiles of:

(1) The two-piece dress block with the straight sleeve.
(2) The tailored skirt block (page 80).
(3) The classic tailored trouser block (page 100).

The two-piece dress block

Draft the close fitting bodice and sleeve block. Follow the instructions on pages 16, 24 and 30 to produce the two-piece dress block.

Adjust waist darting if your waist differs from the standard measurements. If hips differ, see page 188. Transfer the bust dart to the underarm to make the fitting of the shoulders easier; draw a line from the underarm seam to the bust point. Cut along this line. Close the shoulder dart; this will open the new underarm dart. Shorten the dart by 2.5 cm at the bust point.

Cut up the side seam of the skirt. Add 2.5 cm flare to side seam at the hem, join to hip point.

The tailored skirt block

For separate skirts not attached to bodices the tailored skirt provides a better fit, as it gives more shaping to the buttocks. It is useful to have a basic skirt block.

Draft the block (page 80). Separate at the side seam. Add 2.5 cm flare to the side seam at the hem of the skirt; join to hip point.

Classic tailored trouser block

Draft the classic tailored trouser block (page 100).

Note Cut out the blocks as shown in diagrams; add seam allowance of 1.5 cm (no seam allowance at neck or hem of skirt, trousers and sleeves). Tack tape to waist of trousers and skirt.

Pattern alterations for fitting figure problems

If the block has been drafted to personal measurements, it will provide a good fit unless there are special figure faults. Sometimes they are apparent and the block can be adapted before the toile is made up. Often they do not show until the toile is seen on the figure. The faults are then marked at fitting stage and the block is corrected.

Fitting the toile

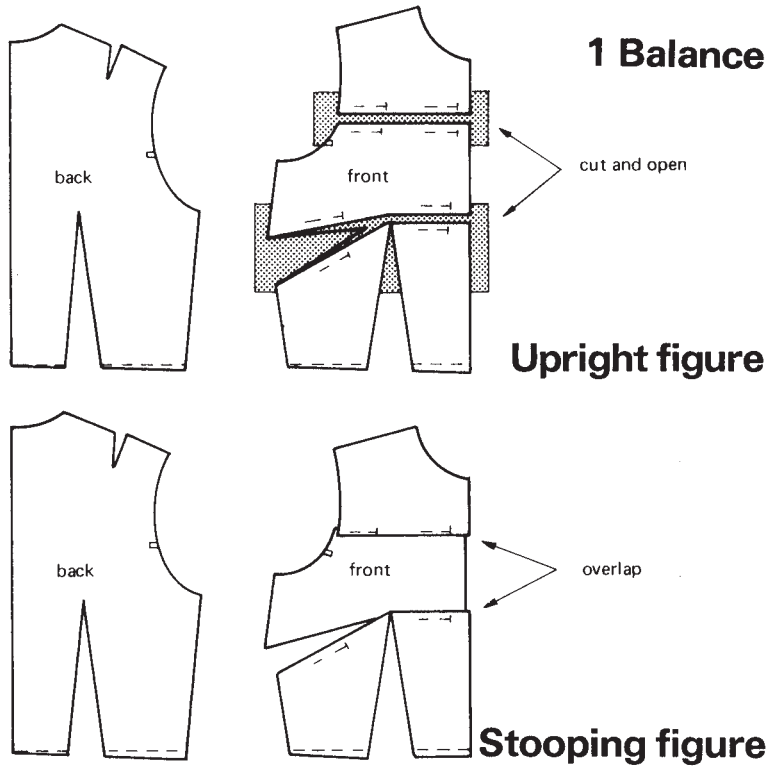
The person being fitted should be wearing the correct undergarments and shoes. She should stand in her normal relaxed position. Pin any openings.

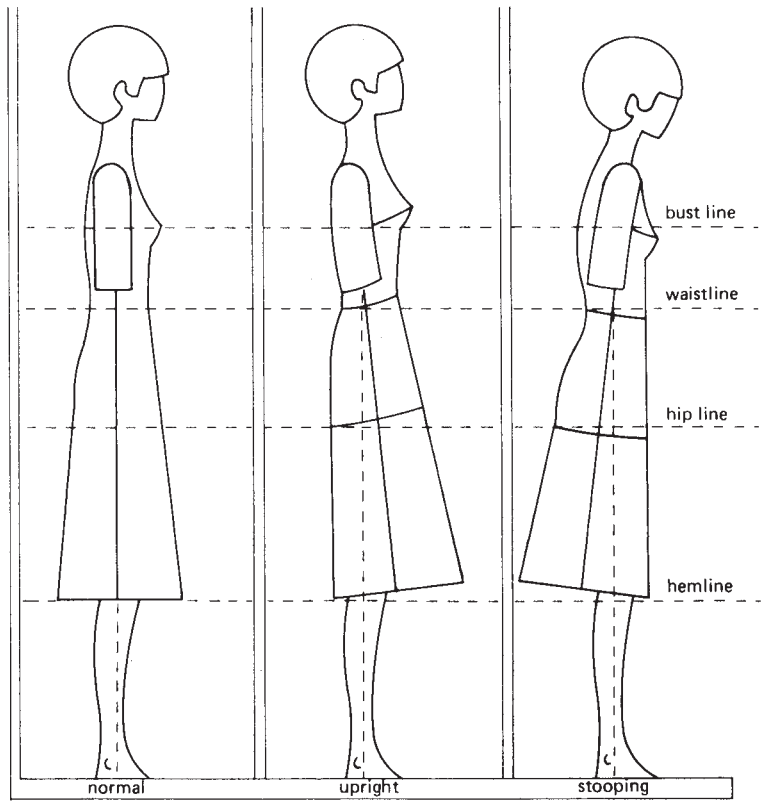
Problems of balance

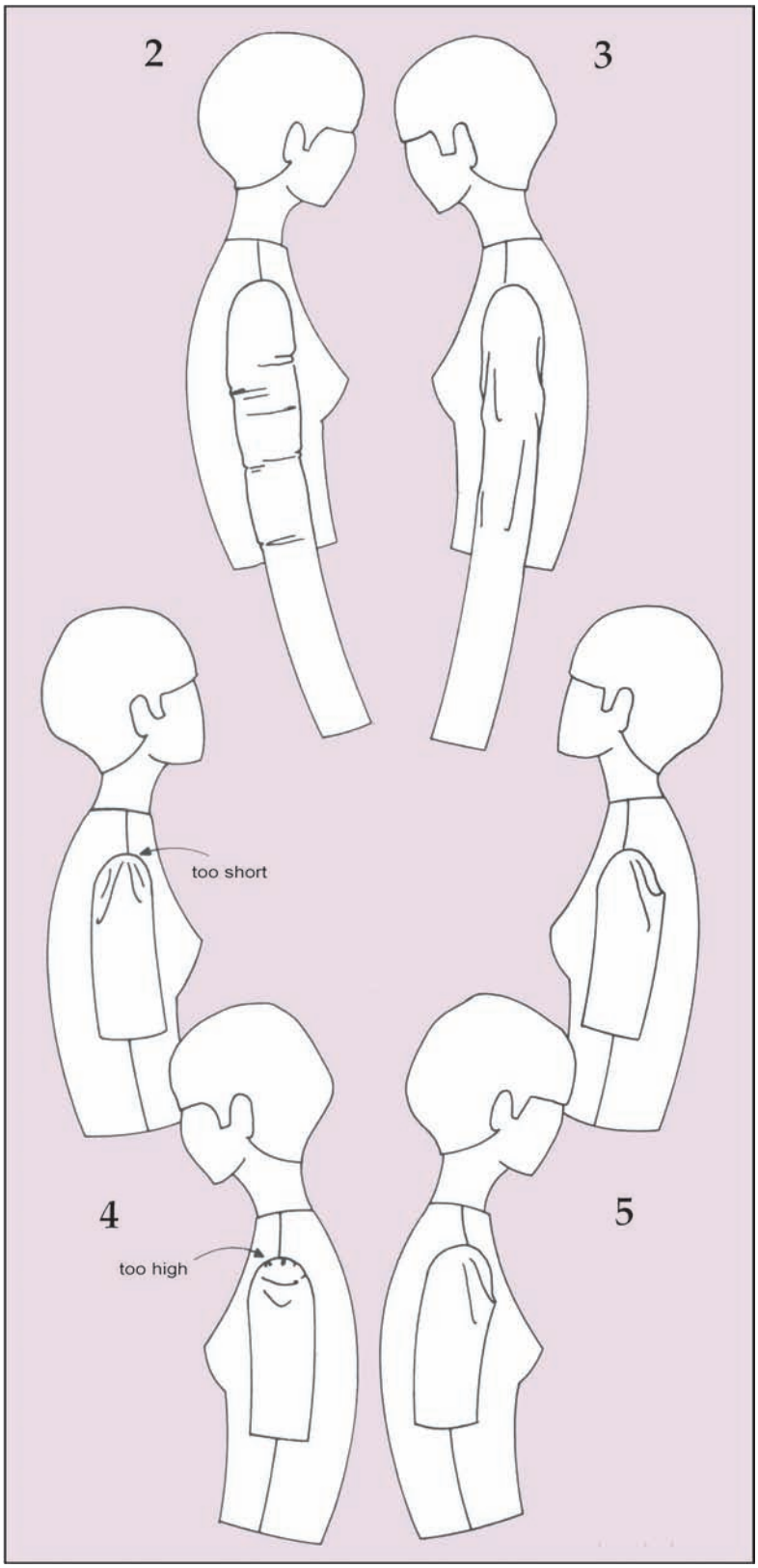
1 Balance The person being fitted should stand a distance away from the fitter to allow a general view. She should turn slowly. Note any obvious faults. Study the side seam; although the person may have an average figure her stance may cause the toile to swing and distort the side seam. See diagram opposite.
Note Make sure that it is the posture of the figure that is causing the distortion and not the figure protuberances, e.g. large bust, as this requires a different remedy.

Upright figure Cut across front block at bust and chest; open amount needed to bring front waistline down to its correct position. The alteration may be needed at chest or bust only. Trace round the new shape. Side bust dart will widen so that the side seams are of equal length.

Stooping figure Cut across the front block as explained above; overlap the amount to be removed. Trace round the new shape. The side bust dart will become smaller so that the side seams are of equal length.







Sleeves – measurement problems

2 Large arm The sleeve pulls tightly across arm and wrinkles.
Cut block up centre line and across the sleeve head above back balance point.
Open required amount as in diagram. Redraw the sleeve head. This increases the sleeve head measurement so the armscye is lowered approx. 1 cm.
Re-mark the balance points to match sleeve.
Note If top arm only is too tight, narrow the side seams to wrist after alteration.

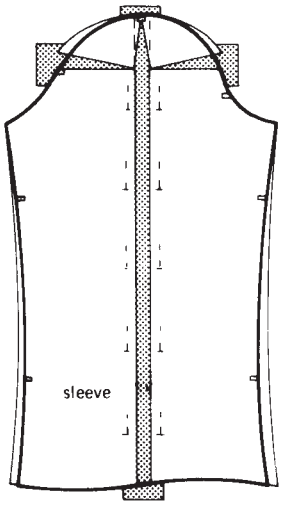
3 Slim arm The sleeve sags and is shapeless.
Cut block up centre line and overlap required amount as in diagram.
Redraw the sleeve head. This reduces the sleeve head measurement so the armscye is raised approx. 1 cm. Re-mark balance points to match sleeve.

Sleeves – figure problems

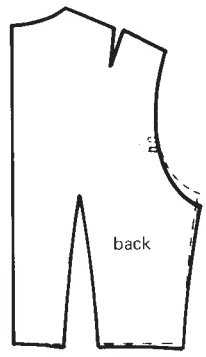
4 Sleeve head too short Diagonal lines pull from shoulder point and there is too little ease in sleeve head. Slash across sleeve head and insert the required amount. This will give the ease required to sleeve head.
Sleeve head too high Too much ease in the sleeve head, which sags. Slash across sleeve head and overlap to reduce sleeve head.

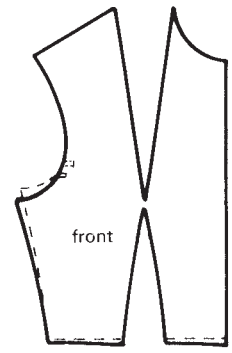
5 Sleeve pitch The sleeve can drag to the left or to the right.
Remove sleeve from garment and pin at the shoulder point so that the sleeve hangs correctly.
Re-mark the balance points on the sleeve.
This often means the underarm seams move out of line. If so, mark a balance point on sleeve to match to underarm.

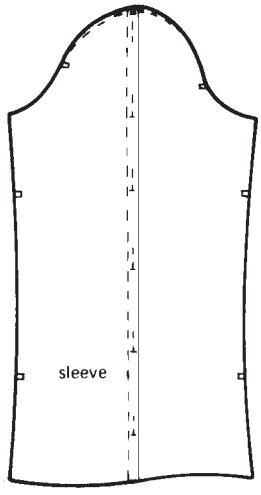
Sleeves — measurement problems



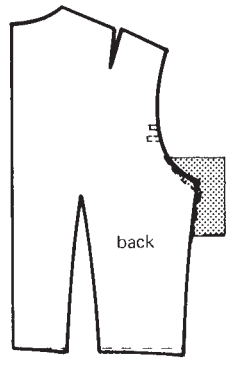
2 Large arm

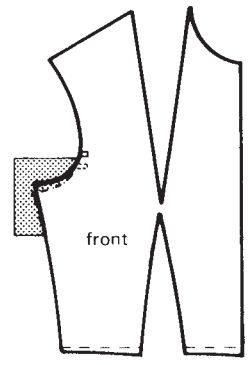




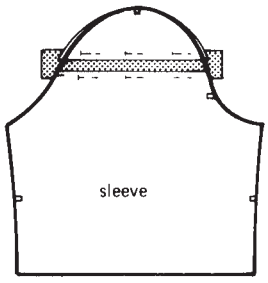


3 Slim arm

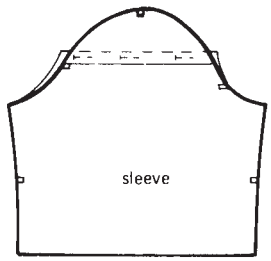




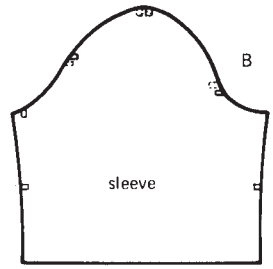
Sleeves — figure problems

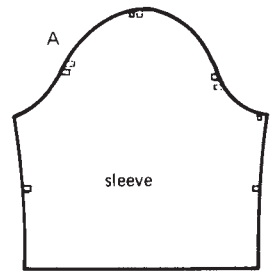


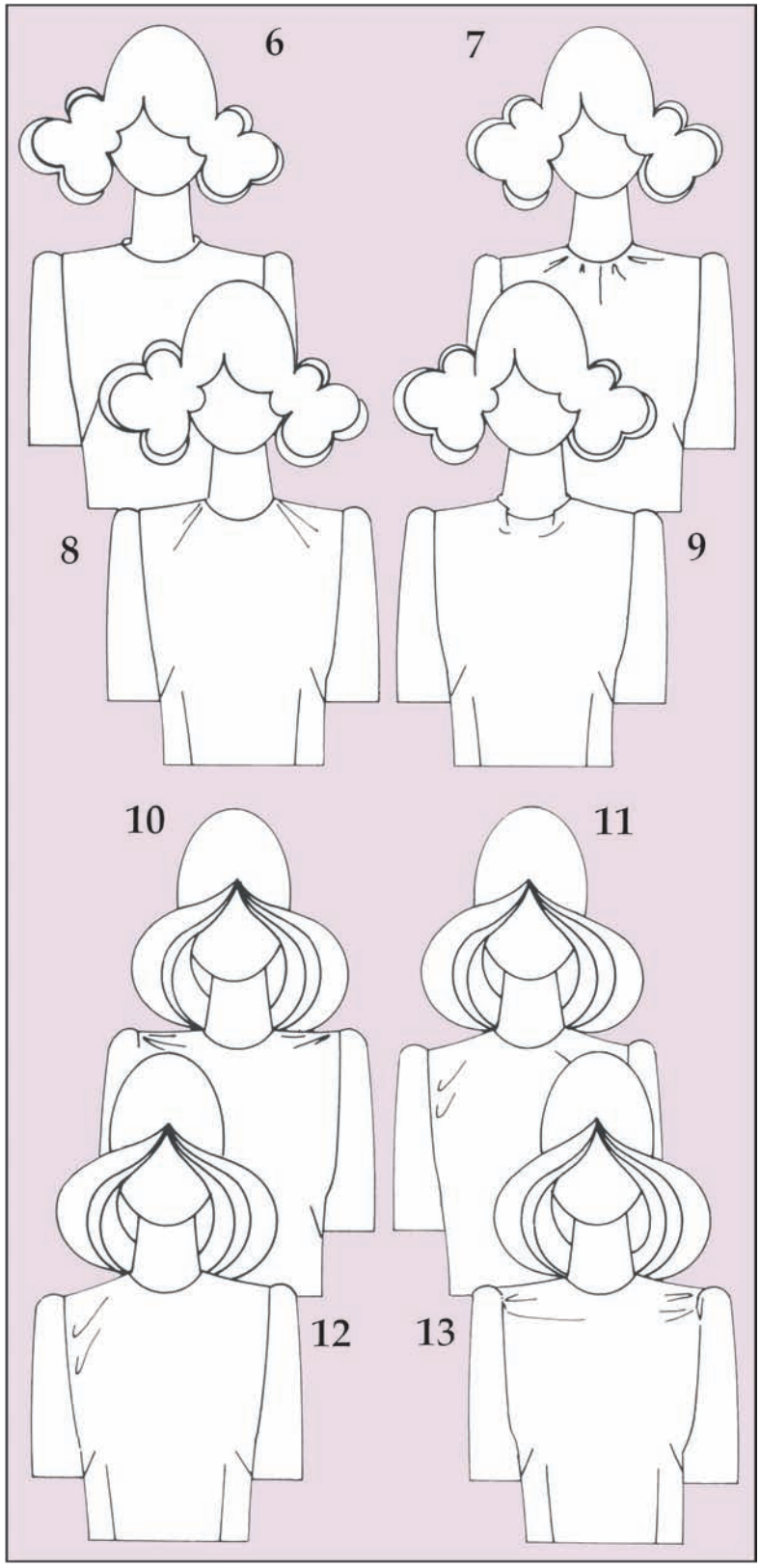
4 Sleeve head too short



5 Sleeve pitch







Necklines – figure problems

6 Wide neckline Neckline sits too far away from the natural neckline.
Raise the back and front neckline of block as required.

7 Tight neckline Neckline grips the neck tightly and wrinkles.
Lower the front and back neckline of the block the amount required.

8 Back neck too tight Neckline drags to the back causing diagonal wrinkles pulling from the neck.
Widen back neck; add same amount to outer edge of shoulder so that shoulder measurement remains the same.

9 Front neck too loose Neckline is too full at the front.
Lower the shoulder line slightly at the neck point and fill in the front neck slightly as in diagram.
Take the same amount from the outer edge of shoulder so that shoulder measurement stays the same.

Shoulders – figure problems

10 Square shoulders Wrinkles pull from outer shoulder.
Slash armscye to neck point as in diagram and open required amount.
Raise underarm so that the armscye measurement stays the same, raise balance marks.
If shoulders are well developed keep original armscye and raise sleeve head (ref. 4 page 182).

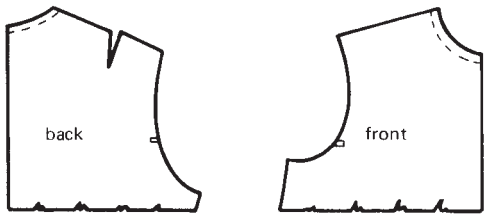
11 Sloping shoulders Sag lines appear at the sides of armscyes.
Slash armscye to neck point as in diagram; overlap required amount.
Lower underarm so that the armscye measurement remains the same, lower balance marks.

12 Uneven shoulders Alter one side of garment only.

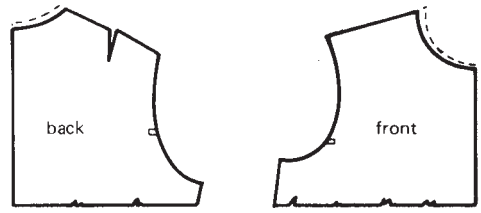
13 Prominent front shoulders Garment pulls across the prominent front shoulder bones.
Slash armscye to neck point as in diagram; open required amount.
Raise head of front sleeve slightly.

Necklines — figure problems

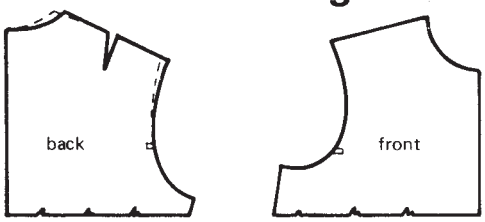
6 Wide neckline



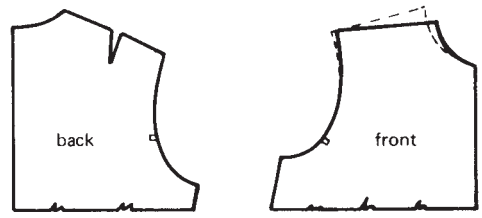
7 Tight neckline



8 Back neck too tight

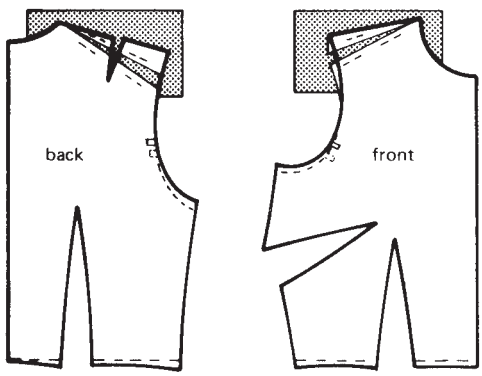


9 Front neck too loose

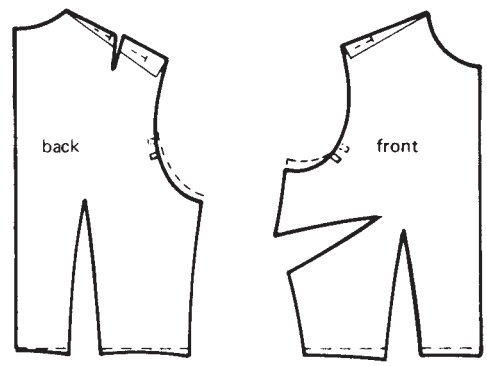


Shoulders — figure problems

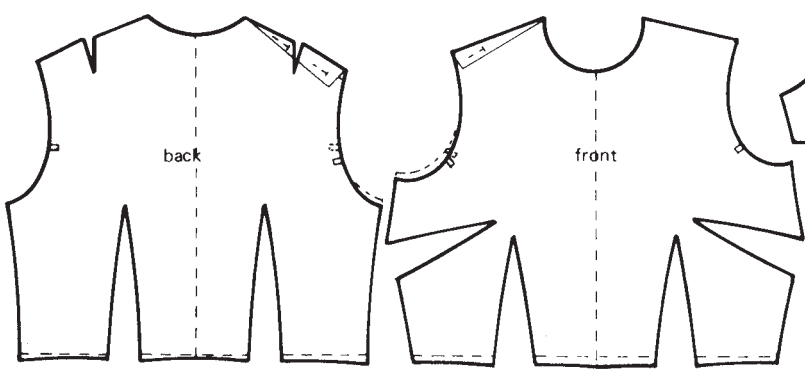
10 Square shoulders



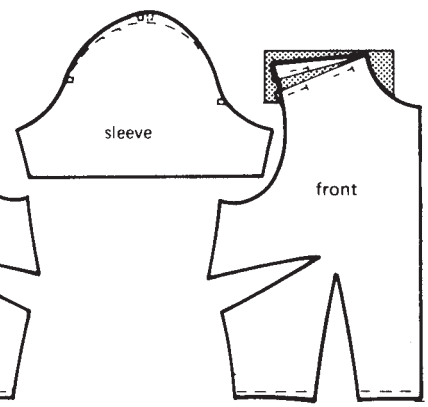
11 Sloping shoulders

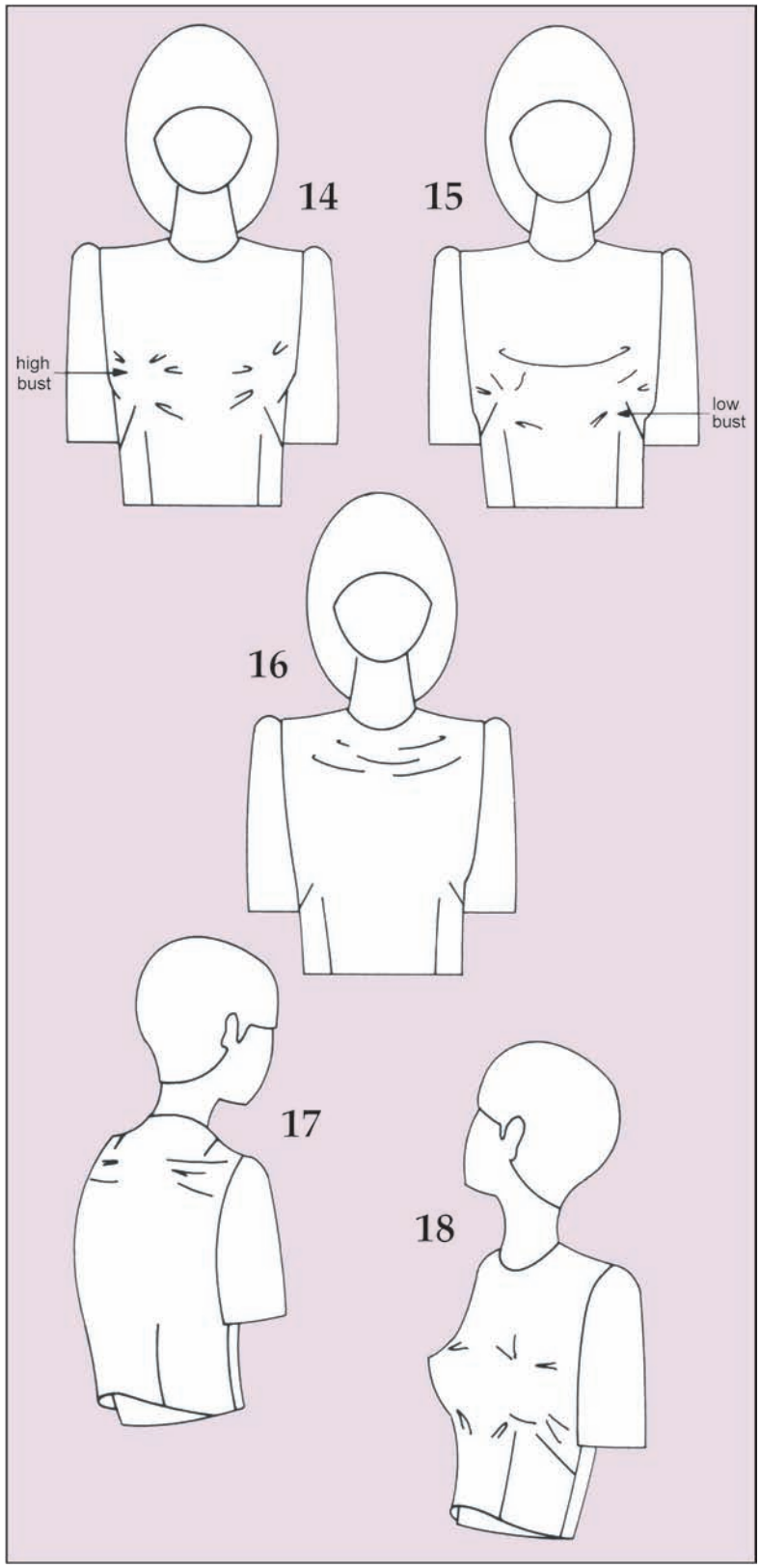


12 Uneven shoulders



13 Prominent front shoulders





Bodice – figure problems

Most measurements should be correct as the block was drafted to individual measurements. The darting will have to be adjusted on the dress block if waist size differs from the standard.

14 High bust Strain and wrinkles show across high bust line.
Mark dart point at the higher level required, redraw dart to this point.

15 Low bust Fabric sags on normal bust line and pulls at dart point.
Mark dart point at lower level required and redraw dart to this point.

16 Hollow chest The fabric sags across the chest area.
Determine the amount to be removed. Lower front neck and shoulder point this amount.
Redraw neck line.
Join new shoulder point to outer shoulder with line.

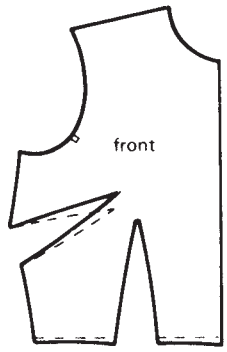
17 Dowager hump A definite hump on the back pulls the fabric across the high back line; bodice rises up at the back. If the rest of the figure is normal, draft block to a standard back length and make the special alteration later.
Slash across the high back line, open up the amount required.
Straighten back seam to a vertical position, this will make a wider shoulder dart. Trace round pattern.

Bodice – measurement problems

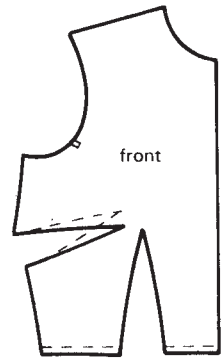
18 Large bust Fabric pulls across bust line and rises up at centre front. If figure is a basic smaller size except for large bust, draft a size smaller, then make alteration.
Slash bodice vertically and horizontally; open the amount required. This will enlarge bust and waist darts.

Bodice — figure problems

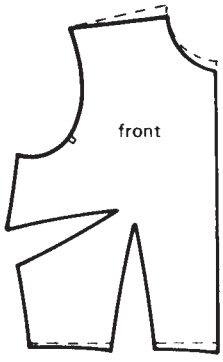
14 High bust



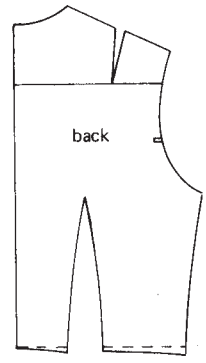
15 Low bust

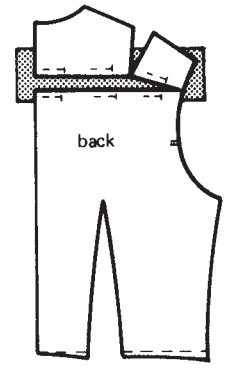


16 Hollow chest



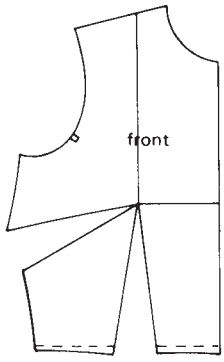
17 Dowager hump

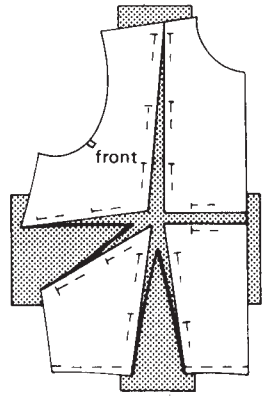


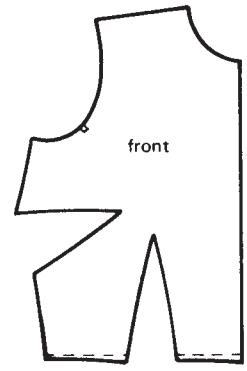


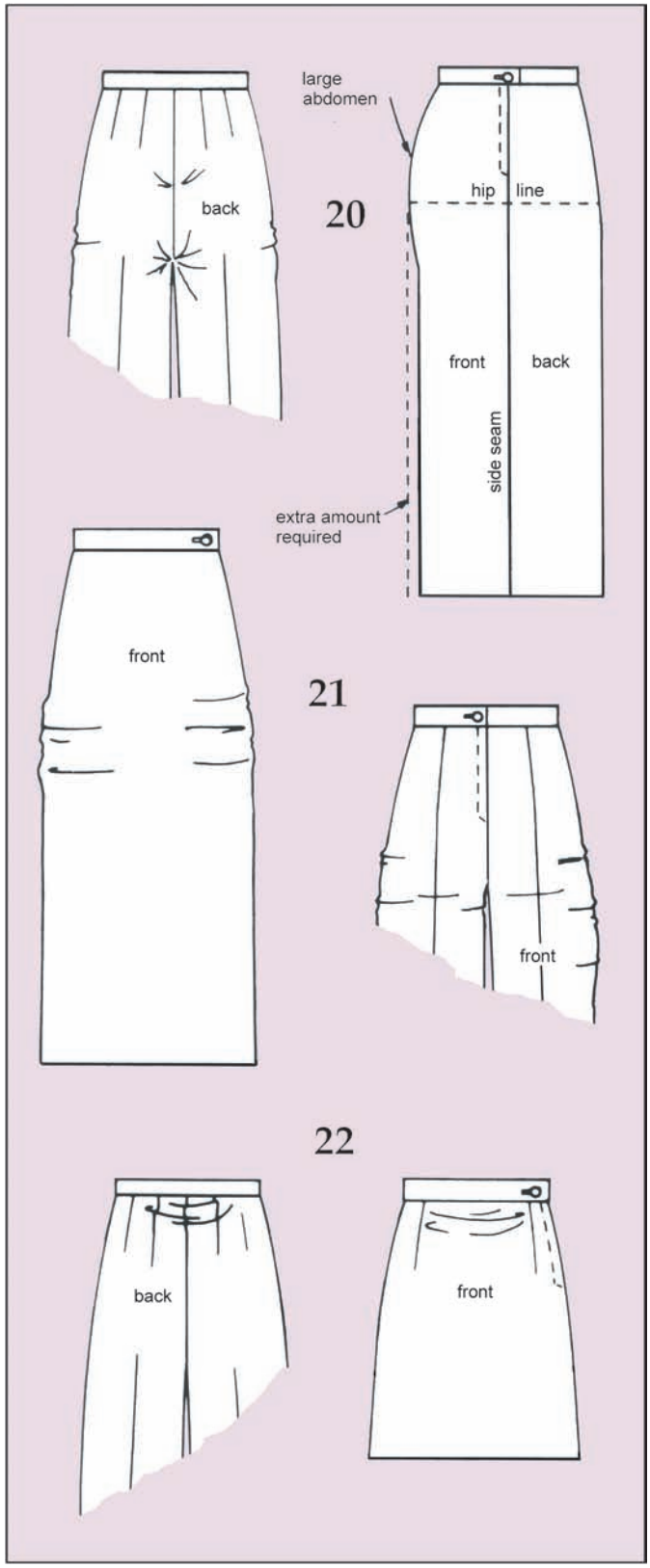
Bodice — measurement problems

18 Large bust









Skirts – trousers – dress blocks – measurement problems

Hips and waist sizes should be correct as they are drafted to individual measurements *except* the standard hip measurements and waist shaping on the dress block used for dresses and jackets.

19 Dress blocks
Waist darts: adjust darts to measurements required keeping the shaping even.
Hips larger or smaller than standard: cut up the side seam of the dress block, work out the difference between your hips and the standard hips for your bust size.
Add or subtract one quarter the difference to back block and one quarter the difference to front block from hipline to hemline. Shape in to meet waist point.
Note On designs where the pattern has no side seam, complete the design then distribute the differences evenly on the panel lines.

20 Large buttocks or abdomen Garments pull across the figure, drag at the crutch in trousers, or a skirt hem will rise at centre back or centre front. Although hip size is correct the garment may distort because the shape of the figure is uneven.
Add required length to the centre back or centre front waistline and at crutch on trousers. (Measure centre back to centre front between legs.)
If the garment still distorts, extra width can be inserted by slashing the pattern vertically and opening as shown. This will give a larger hip measurement, but an easier fitting garment is better for an obvious figure fault.
Note Also see 'Ease in the back crutch', page 132.

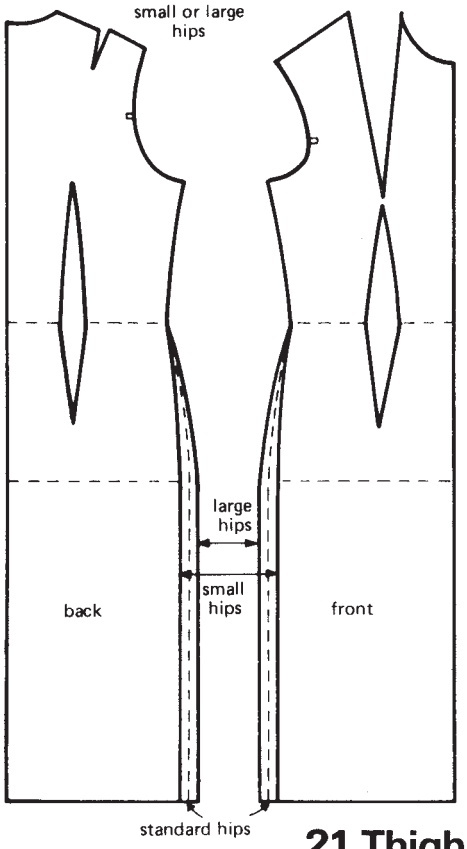
Skirts and trousers – figure problems

21 Thigh bulge Trousers or skirt pull across the thigh line.
Skirt: add required amount to side seam from thigh to hem, shape the line to touch waistline at normal point.
Trousers: add required amount to thighs at point 1. Draw a line from waist through point 1 to touch knee point.

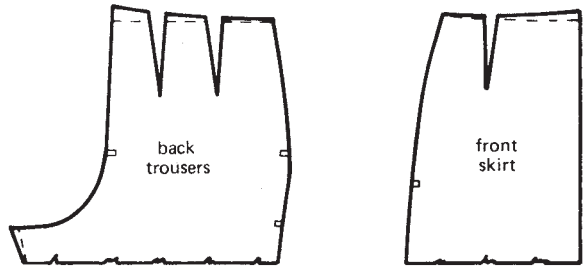
22 Sway back or front Trousers or skirt sag just below waist.
Reduce the 'waist to hip' length the required amount at centre back or centre front.

Measurement problems

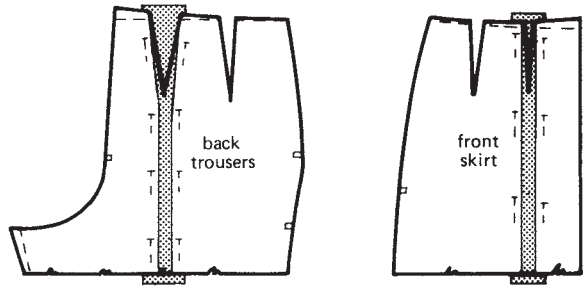
19 The dress blocks



20 Large buttocks or abdomen

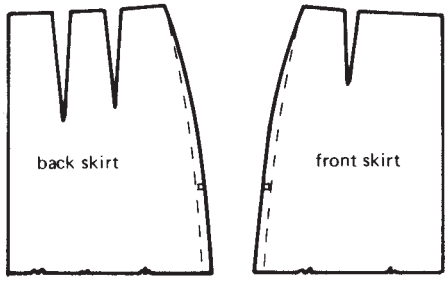


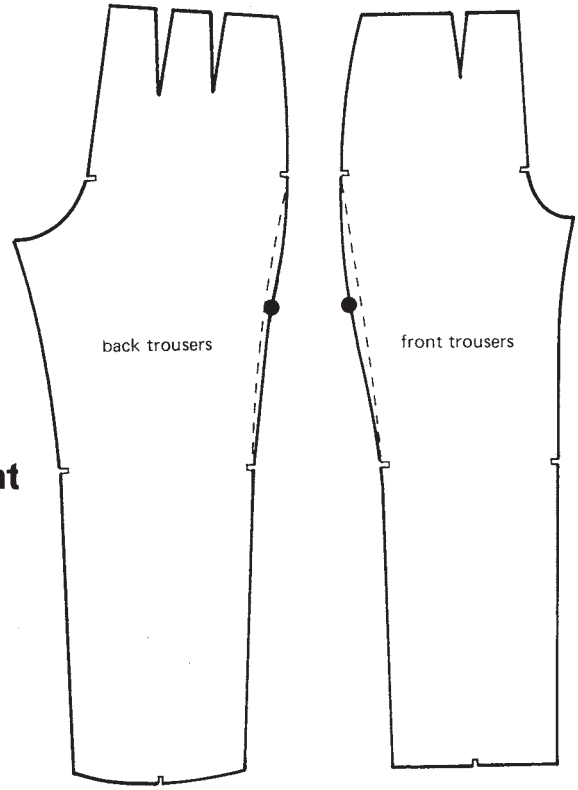
Extra amounts



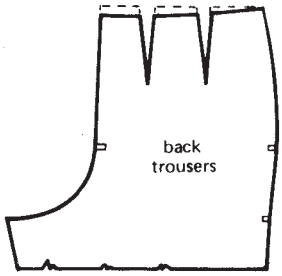
Skirts and trousers — figure problems

21 Thigh bulge

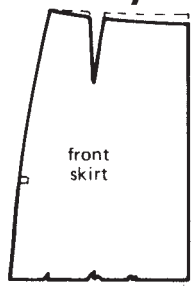


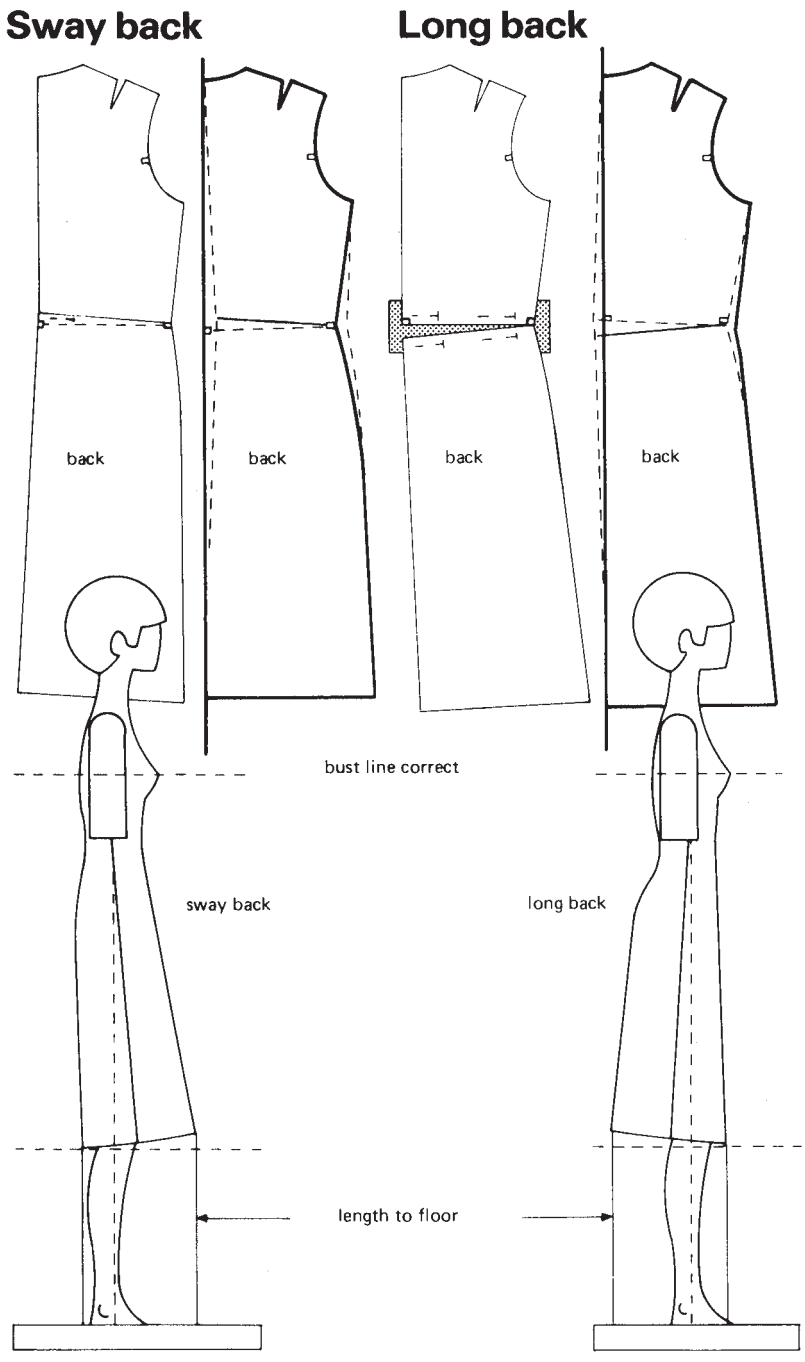


22 Sway back



Sway front





Fitting one-piece dresses and jackets

Dresses and jackets without a seam at the waistline sometimes require a special alteration. This is when the figure has a sway back, or conversely a long back length in the centre area of the body between bust and hips.

Sway back The dress or jacket will swing into the back of the figure.

Correction: measure front and back lengths to the floor to find out how much the back must be raised.

Cut the pattern across the waistline and overlap the amount to be removed.

Draw a vertical line on a new piece of paper; place neck and hem of altered pattern to this line. Trace round pattern.

Reshape the side seam the same amount that is added by the distortion at the centre back seam.

Long back The dress or jacket will swing away from the back of the figure.

Correction: measure front and back lengths to the floor to find out how much must be inserted into back length.

Cut pattern at the waistline and open the required amount. (Place a piece of paper underneath the pattern and pin to this to hold the opening in place.)

Draw a vertical line on a new piece of paper; place neck and hem of altered pattern to this line. Trace round pattern.

Add to side seam the same amount that overlaps the centre back seam.

The block pattern

When fitting the toile, pin the alterations that are required. Mark on the toile any instructions you need; mark with a pencil. Notes on bits of paper are often mislaid.

After fitting the toile, all the alterations must be made to the block pattern. For very difficult adjustments, alter the block, alter the toile and re-fit to ensure that it fits perfectly.

A block pattern should be made in card or strong brown paper as it will be used many times. Some students prefer block patterns cut out in card so that they can trace round them; others prefer to have them drawn on a piece of paper to 'wheel' the outline onto a separate sheet underneath.

PART FOUR: COMPUTER AIDED DESIGN (CAD)

14 Computer generated design and pattern making

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Connectivity and marketing

Connectivity

The way computer aided design (CAD) is used is changing as globalisation makes connectivity a priority throughout the manufacturing process. The full process, from style concepts to manufacture and retailing, is usually an investment made by a manufacturer who makes a particular type of garment in large quantities or has strong links with a major retailer. However, small companies can also benefit from particular elements of CAD.

Technological advances during the 1990s have produced revolutionary changes in communication. The internet links the different sectors of the clothing industry and has become a vital part of many companies' operations. It can connect buyers, designers, manufacturers or suppliers across the world by text and images. Most companies use the Windows® platform, which enables the integration of different types of software programs that can run on the same CAD system.

Raster programs These use pixels on the screen to display and manipulate images. Illustrations or photographs can be scanned into the system and then manipulated.

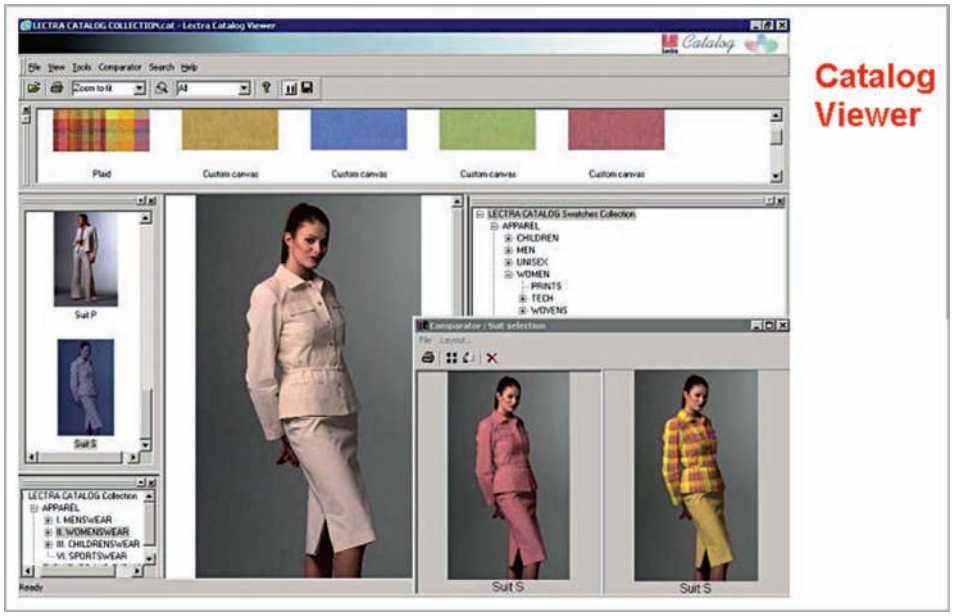
Vector programs These manipulate data in the form of mathematical co-ordinates. They are used for the construction of accurate technical drawings, pattern cutting, grading and marker making. Vector lines can be converted into raster format and many software programs can integrate the two forms.

Product data management (PDM) systems are a major means of connection; they are able to integrate visual information (from either format) with other production and financial functions. Their primary function is to organise and control a company's production but they are the vital link between the company and the retailers.

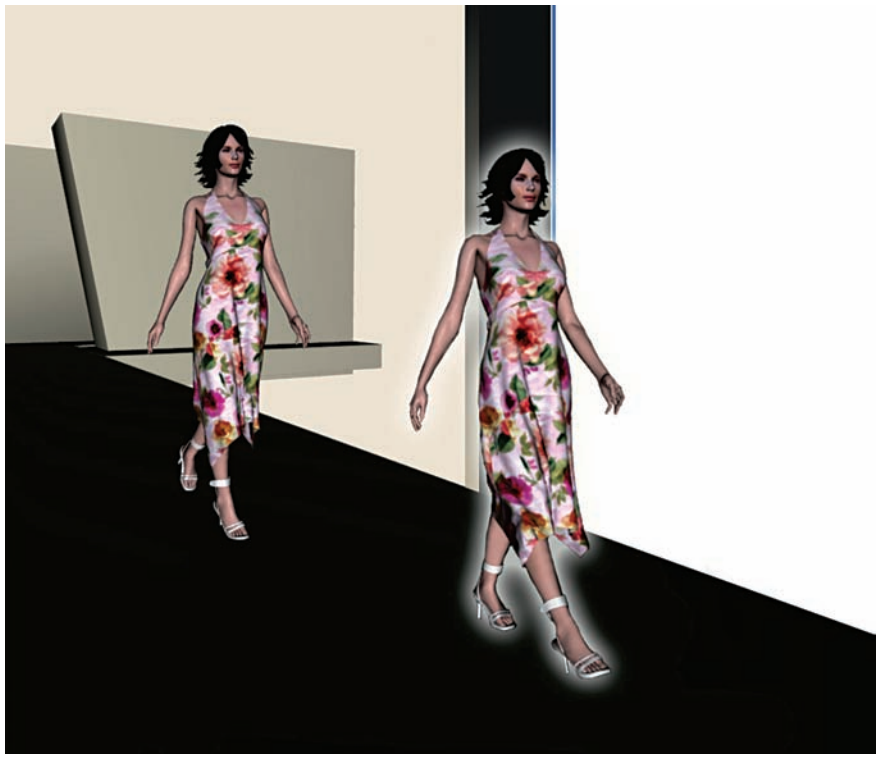
Marketing

Broadband connections have resulted in a dramatic increase in internet shopping. Online catalogues give both retailers and customers a wide choice of merchandise using high-resolution images, some of which show virtual garments that can be re-draped with alternative fabrics and colourways. Others include rotating virtual models that show garments from all angles and allow customers to re-shape the virtual images to their own size. Further developments in virtual reality can create moving models and electronic fashion shows.

Connectivity between manufacturers and retailers is crucial in response to sales and trend changes emerging within 'High-street' fashion outlets. Garment design for major retailers often requires a total concept that reflects a retailer's image. 3D software can create virtual stores. This allows them to create store views with different style areas in the same shop. They can calculate the number of garments to display and re-map the images with different colourways and fabrics.



A page from *Lectra Catalogue* showing a draped garment and alternative colourways and fabrics. *Photograph by permission of Lectra.*



A virtual fashion show *'3D Runway'* with a 3D simulated garment and parametric customised walking mannequin. *Photograph by permission of Optitex*.

Visual merchandising in *Mockshop*, which creates an interactive virtual store with display stands, fittings and garments. *Photograph by permission of Visualretailing*.

Design creation and illustration

The word 'designer' is a broad description covering many different functions. The area a designer may cover can range from the prediction or generation of the next season's range to pattern cutting and responsibility for the finished sample. This has to be checked in all sizes with cost lay plans, costings and manufacturing specifications. A designer in a large company may specialise in a particular area and be part of a team, whilst in a very small company a designer may have to perform all the above tasks.

The introduction of CAD into a company appears to have increased the division between the creation of styles and pattern cutting. Pattern cutting is seen increasingly as a technical rather than a design process. When a company adopts new technology, a division often occurs because different software programs handle graphic data in different ways.

Imaging programs manipulate the data using screen pixels. The programs are used for idea generation, story boards, illustration and many forms of textile design. The software can offer much greater integration between fabric and garment design, offering new possibilities to the designer. Designers emerging from the colleges now feel more comfortable with the technology and this will undoubtedly increase its application. Costs of computers, their associated scanners and printers and some software programs are now relatively cheap and affordable, even by very small companies and freelance designers.

Software programs that work in very high resolution are now available. They produce high quality line output and photographic images.

Today, fashion retailers demand a fast response; the advantages of modifying drawings and printing them with variations of colour and pattern are therefore obvious. Retailers make many decisions from virtual fabrics and virtual garments created by 2D and 3D textile and drape programs. Woven, knitted or printed fabrics can be realised on screen and printed by inkjet printers onto fabrics for instant sampling. Collections can be visualised by mapping fabrics onto sketches and photographs, thus creating virtual models and reducing the amount of samples needed each season. Many companies now see paint systems as an essential part of the early selection stages of design.

New developments in virtual reality are creating moving models and electronic fashion shows, or virtual store displays. It is now possible to access virtual models online through the internet and see them from all angles as they rotate in real time. The garment image can be re-mapped with any of the different fabrics shown on the screen.

Pattern cutting programs are based on vectors that register and manipulate the data in the form of mathematical co-ordinates. It takes time to become skilled in working computer programs; therefore a choice of direction has to be made and there has become a direct distinction between the designer, now seen as a stylist (using *imaging programs*), and the pattern cutter (using vector technology).

Lectra marries its technologies to Datacolour to give identical colourmatching through the design and production cycle. *Photograph by permission of Lectra.*

A 2D storyboard incorporating many CAD images. *Illustration by permission of assyst-bullmer*.

Draping a garment image with a fabric image. *Photographs by permission of Blue Fox Ned Graphics*.

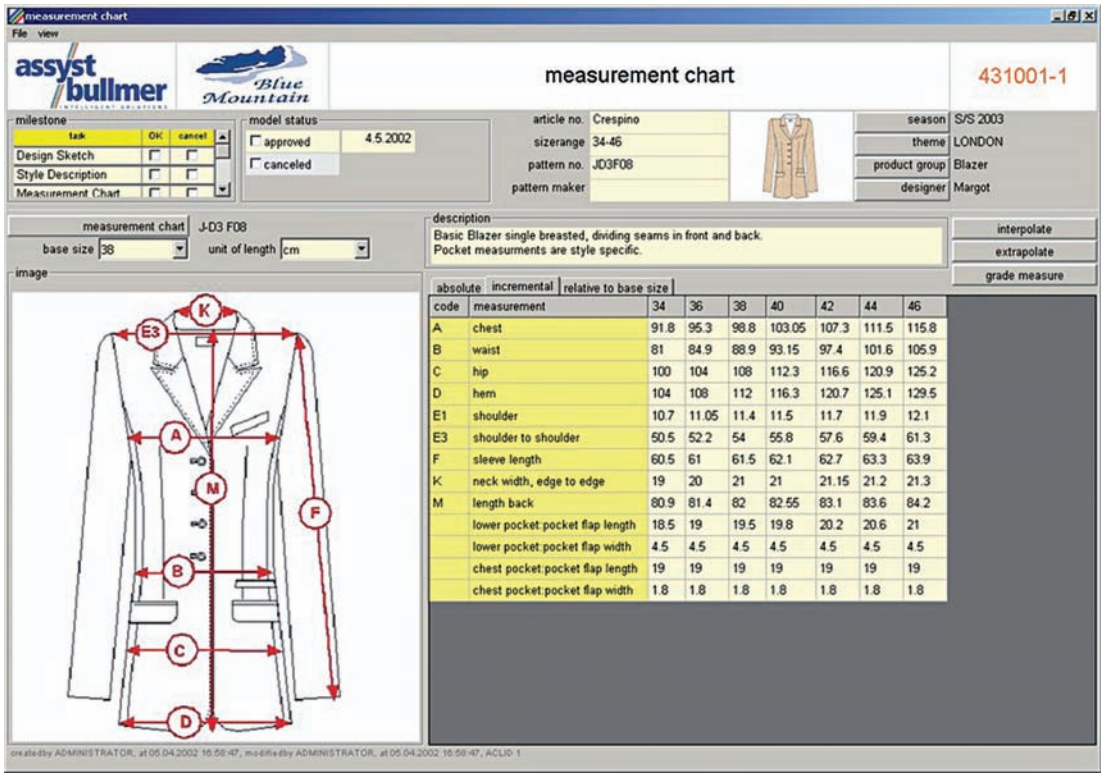
Production data management (PDM)

Students entering their first design position are often astonished at the amount of documentation that is required from the designer. Organisation is central to the designer's work; rigorous notation begins with the early style concepts where initial decisions on fabrics, trimmings and their sources are required. Precise information on sizing, garment measurements and construction details are crucial to the acceptance and production of a style.

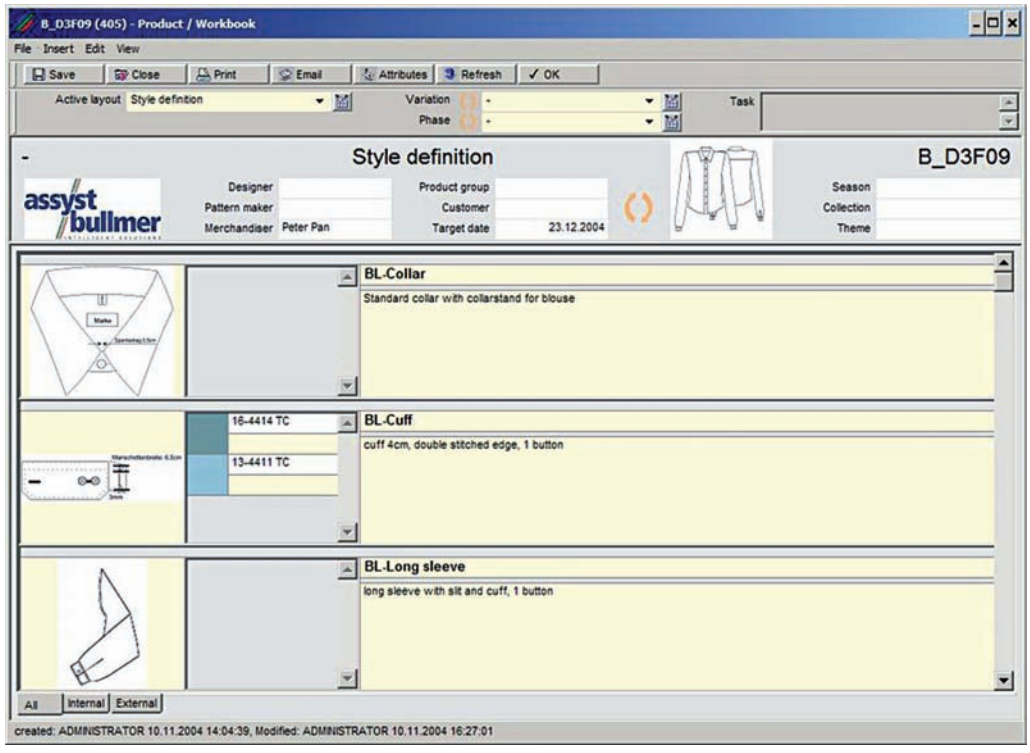
PDM software controls the whole production process of the garment. The production cycle of a garment requires accurate information that can be accessed by all the departments in the company. A production data management system eliminates the repetition of identical information being processed. The information given by the designer on each style forms the foundation for the style to travel through the database as it enters the production cycle. The software allows authorised users to access and modify the sketches or photographs; the pattern, sizing and measurements; the fabric, linings, interfacings and trimmings information; the lay-plan and costing calculations; assembly instructions and making up procedures. External 'cut, make and trim' facilities in other factories and other sourcing information can also be accessed. The information can be constantly updated with everybody being informed instantly about modifications.

PDM modules offer tracking of the workflow of garments and show the status of a style at any time in order to control production schedules and achieve target dates.

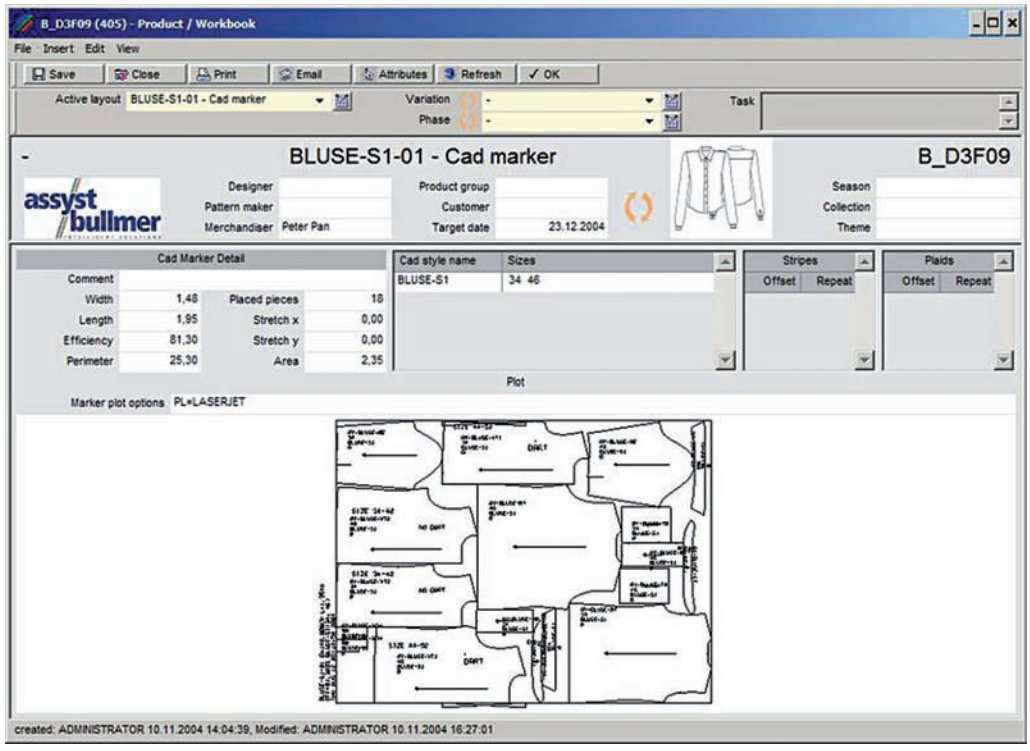
Libraries of visual images of styles and construction processes can be built and accessed for further reference.



pdm.assyst specification form showing finished garment measurements. *Illustration by permission of assyst-bullmer*.



pdm.assyst form showing technical drawings of construction details for a blouse. *Illustration by permission of assyst-bullmer*.



pdm.assyst form displaying a costing marker for the blouse. *Illustration by permission of assyst-bullmer*.

Pattern design and modification – 1

Specification drawings

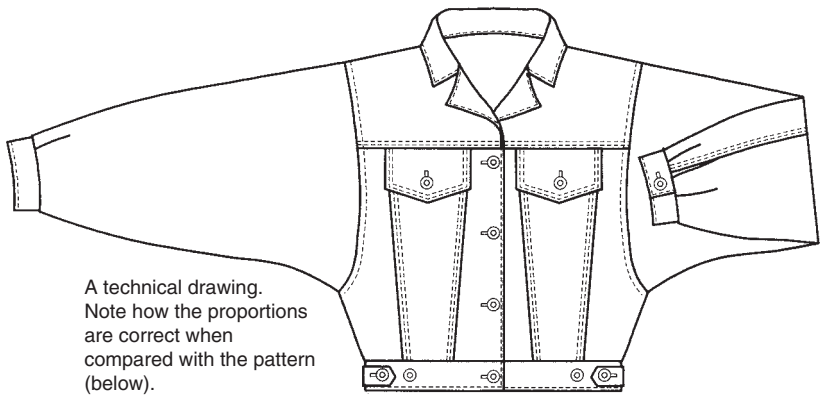
Designers have to record styles by means of specification drawings. This is particularly important for the designer who delegates the pattern development of a style to a pattern cutter. The designer has to develop a concise means of communication within the design team as well as the production staff. The technique of precise technical drawing, in correct proportions and measurements, can be aided by the use of computer software programs such as *Adobe Illustrator* or *Corel Designer.* These drawings can then be imported into most PDM software. The drawing can then be accurately interpreted into a first working pattern. Proportionate measurements can be taken from specification drawings in order to ensure an accurate interpretation of the original design.

Means of pattern development

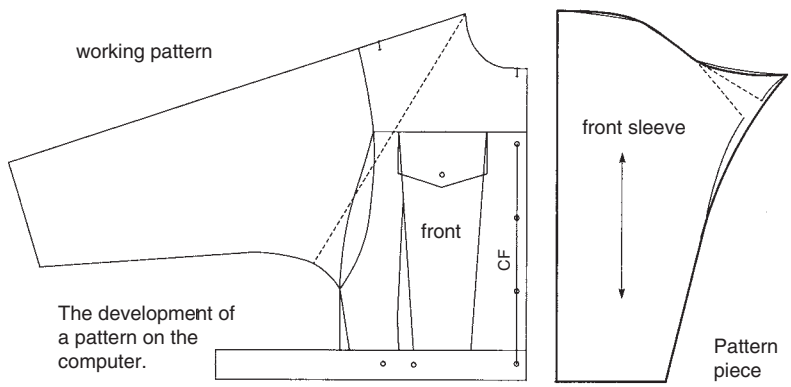
Designers use a range of techniques:

- Modelling the garments on the dress stand.
- Direct measurement.
- Construction of patterns by instructions (usually basic styles in menswear).
- Copy of an existing pattern.
- Adaptation of a previous pattern.
- Adaptation of blocks.

Some designers use a single technique, others combine them to achieve the final pattern, and it is possible to combine any of the above methods with the creation of computer generated patterns. But adaptations of blocks or previous patterns are the ways most companies use their pattern design system (PDS) because they are a means of quality control and sizing standards.



A technical drawing. Note how the proportions are correct when compared with the pattern (below).



A technical drawing and the development of the pattern on the computer. Note how the proportions of the pattern relate to the drawing.

Pattern design and modification – 2

Pattern design system (PDS)

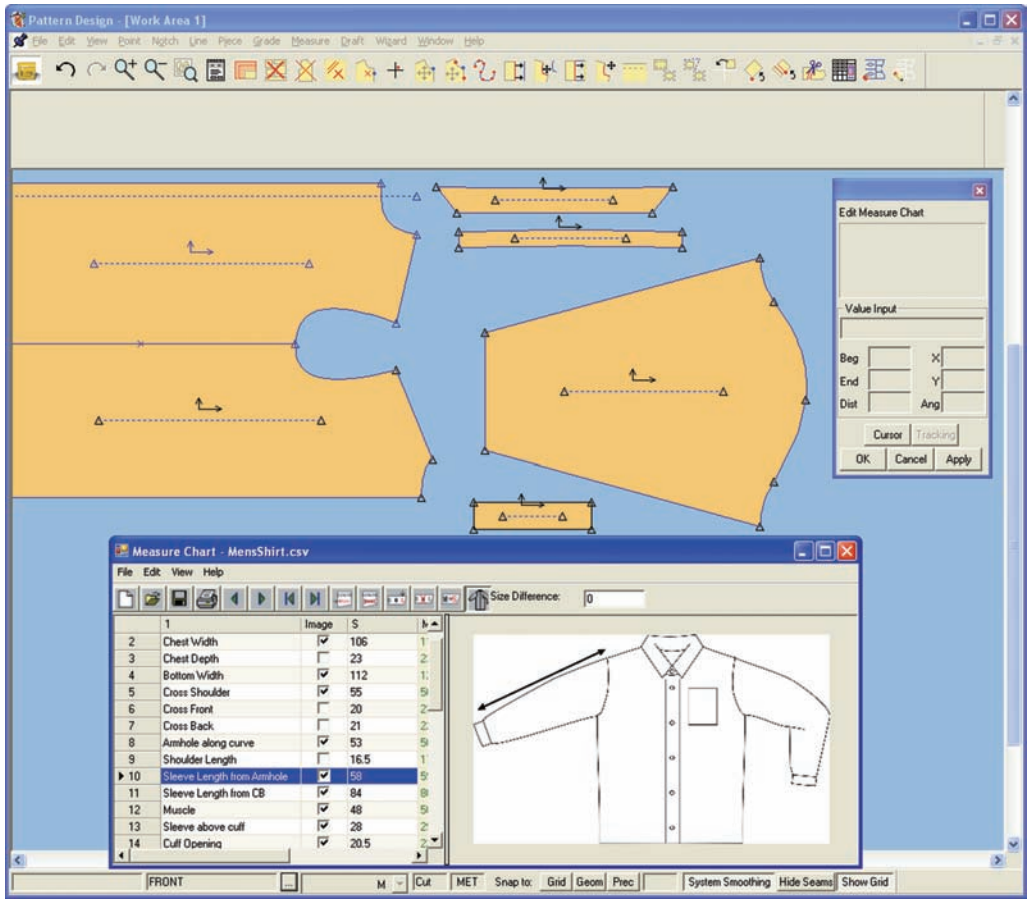
Although patterns can be drafted directly on the screen, a PDS is particularly adept at adapting blocks or modifying patterns stored within the computer. The software can perform many standard pattern adaptations such as swinging darts, adding pleats and fullness, etc. They also perform repetitive tasks such as adding seam allowances, instructions and labelling.

The acknowledged value of a PDS is that it will systemise the procedure of creating an accurate pattern with many similar but slightly differing parts, such as lined jackets and coats. The ability to overlay and check the parts is crucial in this process. The software can also associate parts so that any modification during the development process to the outer garment can be programed to occur on associated pieces, such as the interlining or lining.

Some systems (for example the *assyst-bullmer* software) have 'macros' where the operator can teach the system to perform some drafting operations that are repetitive. This option is ideal for companies producing standard types of design, for example career wear. Some of the more advanced software can program the computer with instructions for drafting a particular style. This method can create patterns to individual sets of measurements, thus creating bespoke patterns for individual sizing.

The 'natural environment' of the work table has been reproduced, allowing a designer to work directly on a digitiser with personal tools and materials, but the lines are recorded electronically.

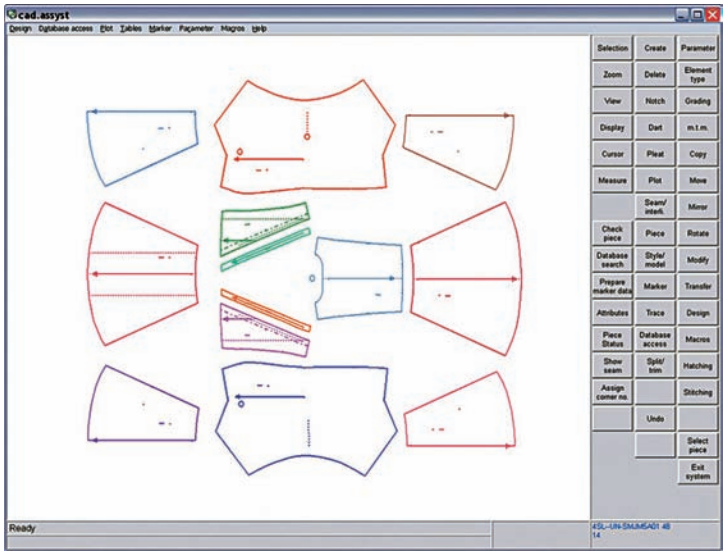
Sample calico toiles that are modelled on the stand, or innovative manually cut patterns (where the shape is changed during the pattern development), can be traced into the system, refined to a production level and seam allowances added.



Pattern development of a shirt with reference to a data measurement chart. *Illustration by permission of Gerber*.

Garment sampling – 3D software programs

Once a pattern is completed for a design, the next process is to create a made up garment sample, often before decisions are made. At least four CAD suppliers are offering differing versions of creating samples within a 3D environment. The aim is to reduce the number of samples or toiles made up in the design room.



Garment pieces created in a 2D pattern cutting program. *Illustration by permission of assyst-bullmer.*

The 3D program *Vilna.* The positions are shown where the garment pieces have to be 'virtually stitched' together. *Illustration by permission of assyst-bullmer.*

The image of the garment 'worn' by a virtual model. *Illustration by permission of assyst-bullmer.*

The CAD suppliers have been concentrating their 3D research on creating programs that will realise 2D patterns as virtual garments on the dress stand or on virtual models by 'stitching' the pattern pieces. This process allows the designer to see how the made up garment will look and fit during the design process. The characteristics of the fabric, particularly its draping qualities, can be entered to give a realistic image. However, the most success has been with garments that fit closely to the body form. The stand or virtual body can be modified to different shapes and sizes and some programs also show the ease distribution.

Many companies have been reluctant to purchase 3D programs. They prefer to rely on experienced designers and pattern cutters, who have worked with pattern shapes and fabrics, and can visualise 2D shapes as 3D images. But as internet communication across the world is becoming so important, 'virtual 3D samples' are likely to have an increasing role.

Garment sampling – textile print

Many of the CAD suppliers offer textile programs of different levels. CAD software has been developed for most textile processes, some directly linked to production machinery. However, for garment designers, it is the textile simulation programs (see page 196) that have proved to be most useful in the creation of storyboards or style concepts and the development of ranges.

A0 digital printers now offer the possibilities of creating short sample lengths of printed fabric. This means that sample garments can be made up, evaluated and modified during the process of style development. Some software programs allow the textile design to be integrated into the garment pattern shapes on screen and then to be produced as printed fabric shapes ready for making up.

The 3D programs that create garment simulation on models take this technique further; the sample can be seen revolving in real time so that the print design can be checked from all views.

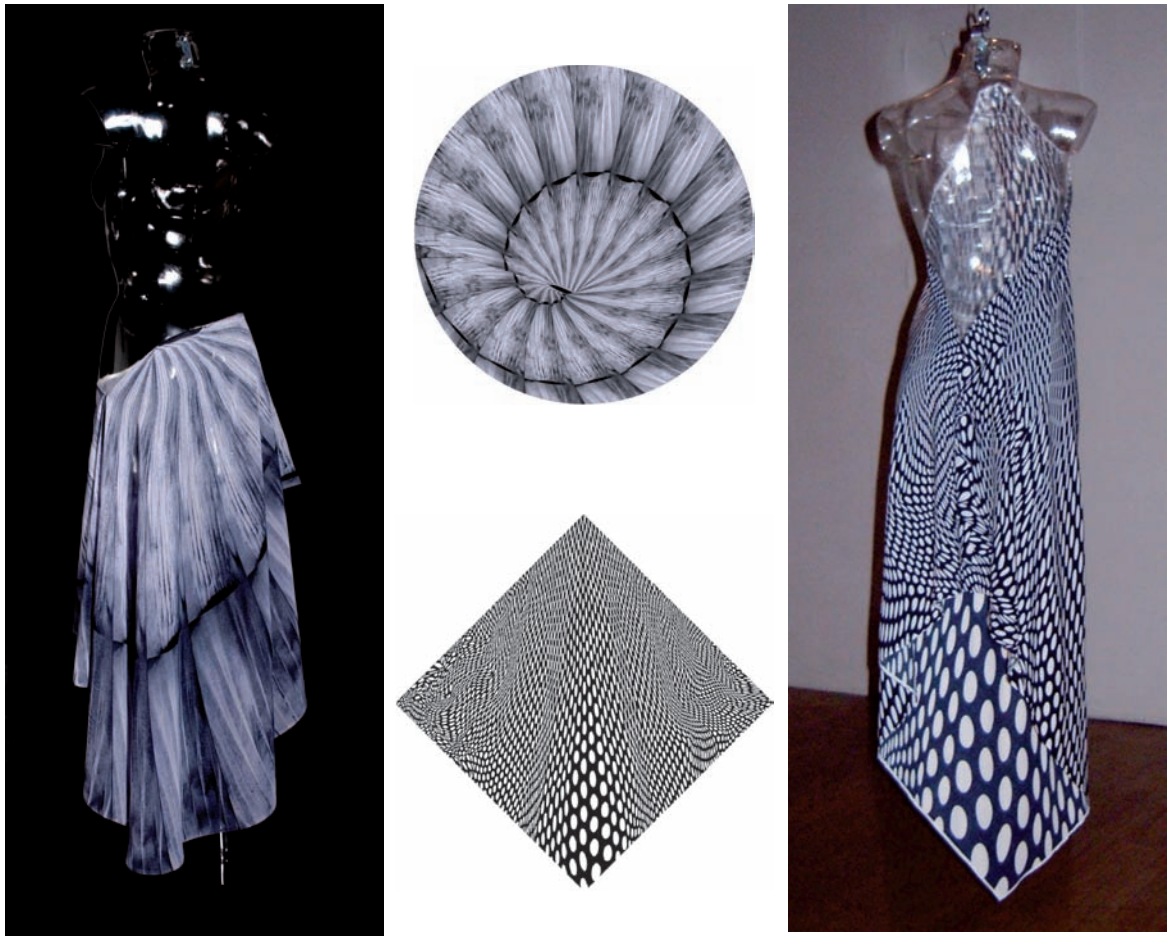
Pattern development incorporating printed textiles. Fabric pieces printed out on an inkjet printer and then made up into sample garments. *Photograph by permission of Lectra.*

Design innovation – pattern shapes and print

The possibilities of integrating fabric design into pattern shape can be used not only for the quick sampling of garments. A few designers are creating new concepts of 2D to 3D design; they see the print as an integral part of the pattern shape, which should evolve and change as the pattern shape is developed. They also use the power of technology to create new forms of imagery in their textile designs.

Using the basic shapes, the circle and the square, researchers at the Nottingham Trent University have used the drape manipulation attributes of the technology to develop and change the print *during the process of garment design*.

Working with simple pattern shapes can give students an opportunity to explore the relationship between the surface imagery that they create and the form.



Working with the circle and the square; experimental and integrated garment and print design. *Photographs by permission of Katherine Townsend and Gillian Bunce*.

Sizing and made-to-measure

An increasing number of companies are including made-to-measure software in their product range. Different elements of the CAD process have made this feasible. Mass customisation is seen as offering a better fit, and also a wider choice of styles, fabrics, linings and trimmings.

The standard process

The process begins with the customer's measurements being taken manually, or by 3D scanning systems. These systems not only provide the measurements of the customer, but also define the form of the virtual figure that can be constantly updated.

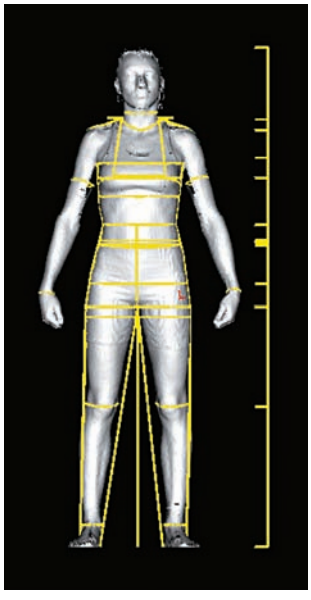
Fabrics and styles can be selected in the store or via the internet. Once the style is selected, the customer's measurements are compared to the nearest size of pattern stored in the system. A second layer of grade rules is then used to cover most basic alterations and body stance. When new measurements are given, the system automatically modifies the pattern to the new measurements.

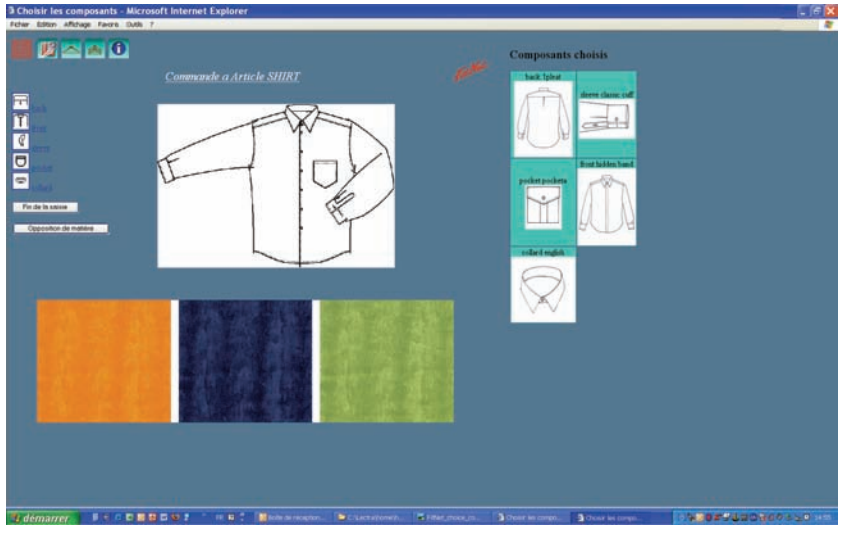
Non-standard adjustments can be made in pattern design software. Any lining or interlining pieces can be automatically adjusted, and small pieces, such as pockets and collars rarely need adjustments. A lay plan is constructed for the modified pattern; this is sent directly to a single ply cutter which cuts individual garments at high speed.

Other software developments

The demand for made-to-measure software programs has led to a different way (parametrics) of constructing patterns in CAD. The patterns are defined by a set of dimensions that can be modified by typing in new measurements. If a point is dragged by the mouse, the system recalculates the entire model accordingly.

Expermental work has been undertaken to create 3D sized garment patterns by the 'wireframe' modeling techniques that are used in solid product manufacturing. Some success has been achieved in creating body fitting garments such as bras and some athletic wear. However, the complexity of the fit and shape of many garments, particularly those in fashion wear, means that the adoption of these techniques by the current clothing industry is unlikely.





Measurements taken by body scanning, and fabric and style selection for made-to-measure garments in the *FitNet* program. *Illustrations by permission of Lectra*.

Pattern grading – 1

Overview

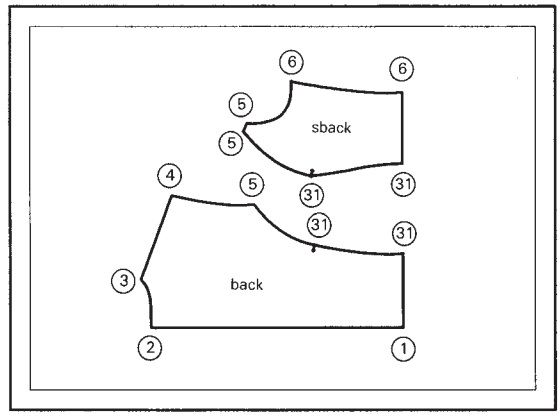
Grading offers manufacturers more speed, accuracy and consistency in sizing their patterns than can be achieved by manual grading. After the sample design has been accepted and a retailer has placed an order, the garment has to be produced in a range of sizes. Most large companies are now using CAD to grade their patterns.

Patterns created within a PDS can pass directly into the grading section. However, some companies with CAD systems are still cutting patterns manually. Therefore, they have to input their pattern by digitising the contour.

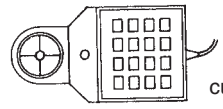
The input of patterns

If a pattern has been cut manually, it is usually digitised into the system. The pattern is placed on the digitiser and the profile of the pattern is entered by accurately identifying the end of straight lines, and points along curved lines, with the cross hairs of an electronic cursor. Folds, the grain line and the position of notches, pockets and buttonholes are also entered.

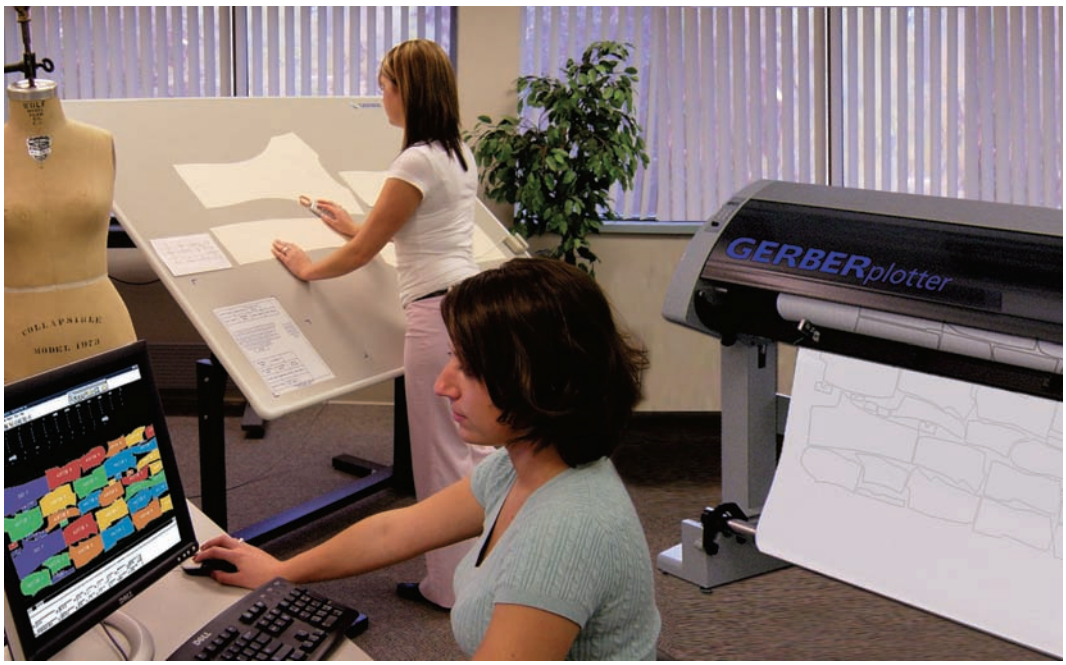
Points to be graded, and also their rules, can be entered during the digitising or can be recorded later when the pattern is on the computer screen.



grading points



An alternative system of inputting patterns has been developed: *Digiflash*, by Audaces, uses a digital camera to record the patterns. The pixellated images of the patterns are then automatically traced to outlined shapes for further processing.



Digitising a pattern. The image also shows a cost marker of graded pieces and plotting out on an A0 plotter. *Photograph by permission of Gerber.*

Pattern grading – 2

The general grading process

Some basic sizing information is required for a set of graded patterns to be produced. The following sources can be used:

- Size charts of body measurements.
- Garment specifications.
- A set of manually nested patterns.
- Grade rules supplied by a CAD supplier.
- Grades copied from a graded pattern shape already in the computer system.

The grading of patterns by most CAD systems is based on identifying where specific points on the pattern have to be extended or reduced to create a new size. These points are moved by X and Y co-ordinates that tell the computer the direction of movement; measurements are given to identify the position of the new point. This co-ordinate is known as a grade rule.

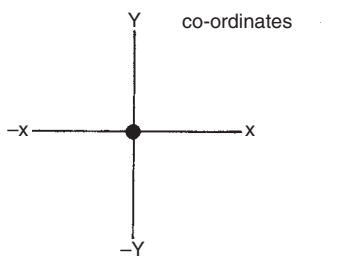
Calculating a grade rule

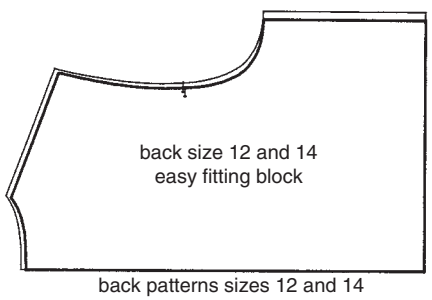
Grade rules are usually calculated to one tenth of a millimetre. The amount of movement in the X direction is written first, followed by the Y direction. For example, the movement of the shoulder point between sizes is –4 mm horizontally and 4 mm vertically (see diagram).

The grade rule can be written in one tenth of a millimetre (e.g. –40 40 mm) or in centimetres (e.g. –0.40 0.40 cm). It is the instruction across a range of sizes. Inconsistent grades between sizes can be registered. The same grade rule can be used at any point that requires the same grade. One grade rule is written as zero 00.00 00.00; it is used where no grade is required.

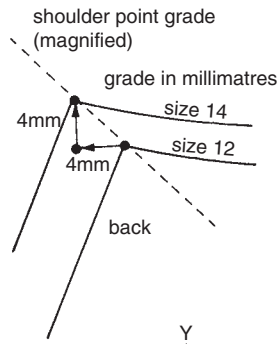
Companies often calculate many of the rules directly from the size charts or garment specifications. However, manually graded 'nests' of blocks can be used. The nest is 'stacked' usually on the armscye depth line. The directions of the X and Y co-ordinates are registered from this point. Each graded point on the nest (these are the beginnings and ends of lines and specific points, i.e. control points or notches) is measured. The measurements are checked with grading increments on size charts.

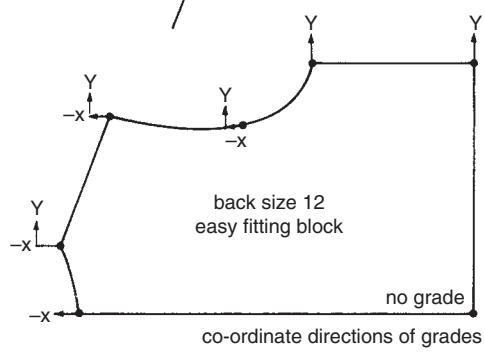
Grade rules can be copied from other patterns; many companies use this method. Also, patterns with grade rules attached can be modified, and these grades can be retained on the new style. This is a quick way of producing grades for sample costings.





back patterns sizes 12 and 14





co-ordinate directions of grades

Pattern grading – 3

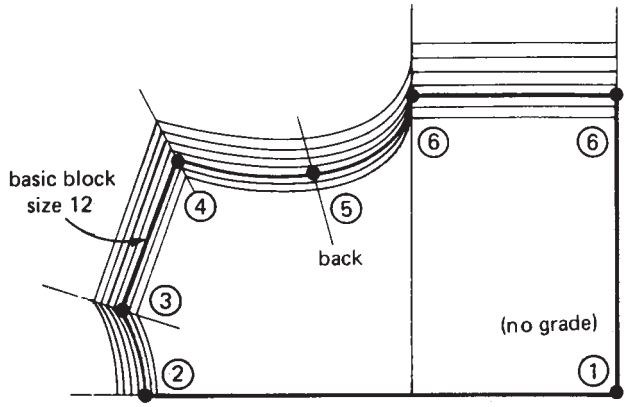
Grade rule libraries

Grade rule libraries are use by many large manufacturers, particularly where their products do not vary greatly.

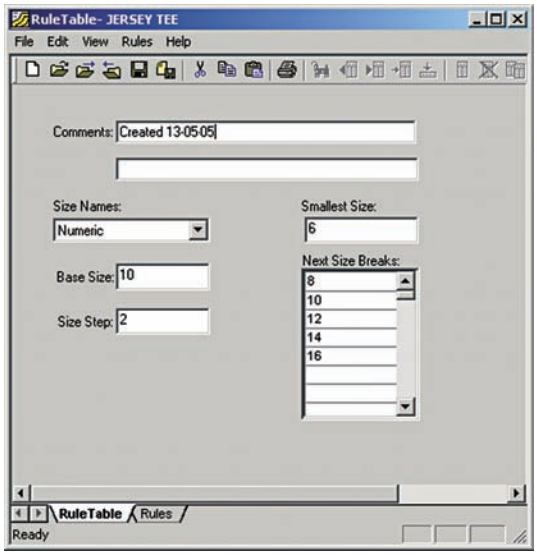
A grade rule library is compiled of numbered grade rules to be used at the grade points. When the number is attached to a point, it will operate the grade. See the diagram below. The number of sizes, the size breaks and the names of the sizes have to be entered into the program. The grade rules for the pattern are then typed in to create a library for that size range.

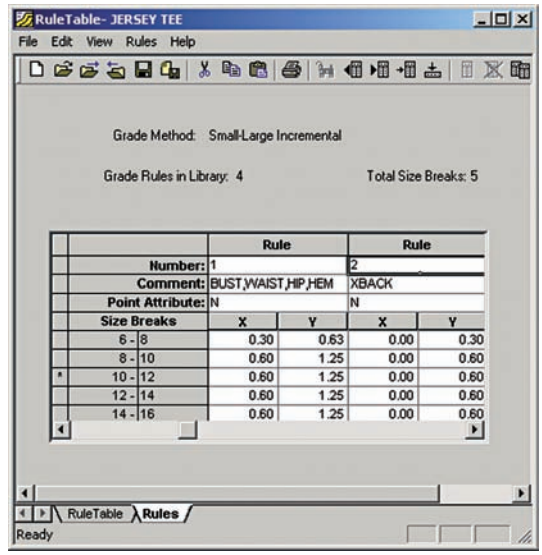
Once the rules for a block or basic pattern are entered into the library, any similar or adapted pattern can also be graded using the same grade rules. However, few patterns are exactly the same shape. This means that new grade rules have to be calculated by the grader and these rules added to the grade rule library.

The rule libraries of companies with diverse products can become very large, even when split into sections. This is the reason why some companies prefer to apply grade rules interactively or by copying them from other patterns.



easy fitting block size 8–20





Examples of screen displays showing the input of sizes and grade rules. *Illustrations by permission of Gerber.*

Pattern grading – 4

Grading the pattern

Pattern pieces, whether they have been digitised or generated in a PDS, will be checked to make sure that all grade rules (applied by any of the methods described) are correct. The instruction to grade the pattern is then given.

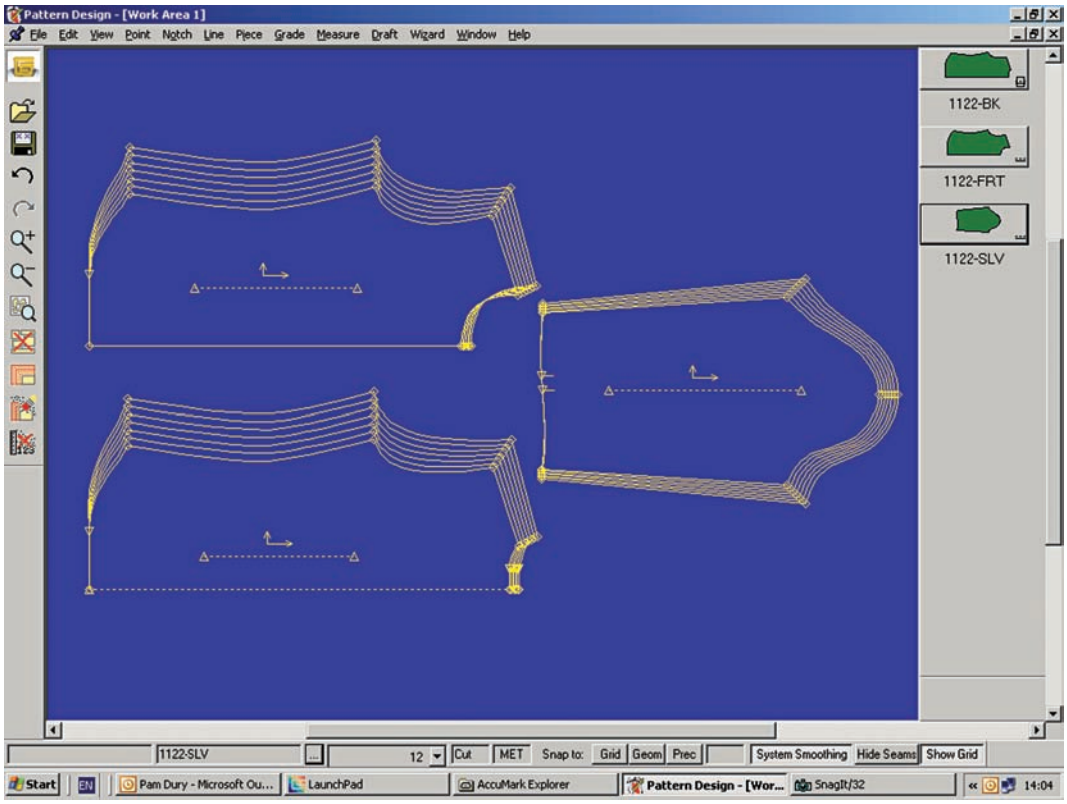
This order will generate a nest of grades over a range of sizes, using the grade rules attached to the piece or from rules stored in the grade rule library. The graded patterns appear on the screen where they can then be checked. The patterns can then be drawn out on a plotter or sent directly through the system for lay planning and cutting.

Further grading techniques

Sophisticated grading techniques are now included in many programs. Perpendicular grading calculates the grades with reference to the angle of another line; tangent grading techniques control points along a line or the length of the line itself. If a graded pattern is split, the system will grade the new seam lines proportionally. Graded patterns can be visually modified on individual sizes and these modifications are automatically updated on the rule table. 'Walking' graded pieces allow seams to be checked for measurement along the making up lines.

A number of companies are developing systems based on parametrics. The sizes are based on the measurements used to draft the pattern. Any new sizes are generated not through point movements but through measurement changes.

A number of small clothing companies do not have pattern cutting or grading expertise, so some software companies offer a range of patterns of basic garments (with alternative sleeve and collars) already graded. Short-cut techniques are useful for companies with a narrow product base but this method does restrict their styling capabilities.



Examples of a screen display showing graded pieces. *Illustration by permission of Gerber*.

Creating models

Most of the middle and larger size clothing manufacturers are using CADCAM (computer aided design and manufacturing) systems. The principal reason why they buy a system is to improve their fabric utilisation and the speed of their production. More than one lay plan is usually required for a style; separate models are required for interlinings, linings or contrasting fabrics.

A model is created by calling up the style's pattern pieces (stored in the system) that are to be cut in the particular fabric. Information about the number of pieces, and whether a piece is mirrored or paired is then required. Further style information can be accessed from PDM software and many systems are multi-tasking, allowing the operator to work on different programs on the same screen.

A marker order for a lay plan

A marker order for each fabric needs the following instructions:

(1) Piece name.
(2) Sizes.
(3) Number of pieces.
(4) Fabric constraints (single- or double-ply, face-to-face, one-way nap or pattern).
(5) Any blocking of areas.
(6) Any buffering around pieces.
(7) Matching of checks or patterns.

Cut order planning

Order processing for production lay plans can be very complex. There can be as many as eight fabrics in a jacket, each requiring a model and separate lay plan (marker). In addition, large orders with many sizes will need a number of markers. It is the length of the cutting table, the width of the fabric and the number and sizes of the garments that determine the cutting plan for the markers.

Fabric utilisation is crucial to a company's profitability. Cut plan software programs claim to calculate the best plan efficiency for the number of garments in the order by distributing the sizes in different markers to get the best efficiency. Some programs will also calculate any greater efficiencies that can be achieved by changing the proportion of sizes in the order and will offer a range of alternatives to the company.

Marker making

Once the information for the order has been processed, lay planning software brings the pattern pieces in the correct number and rotation (one-way or two-way fabric) for the particular marker onto the screen. The pattern pieces can then be placed manually by an operator 'dragging' the pieces into position. Many options allow actions such as the grouping of pieces, the splitting of pieces, and stripe and plaid matching capabilities.

The utilisation figure is shown as the marker is constructed. Fabric utilisation is the amount of cloth area used by the pattern pieces. Manufacturers expect this to be higher than 80%; the higher the figure the less cloth is wasted.

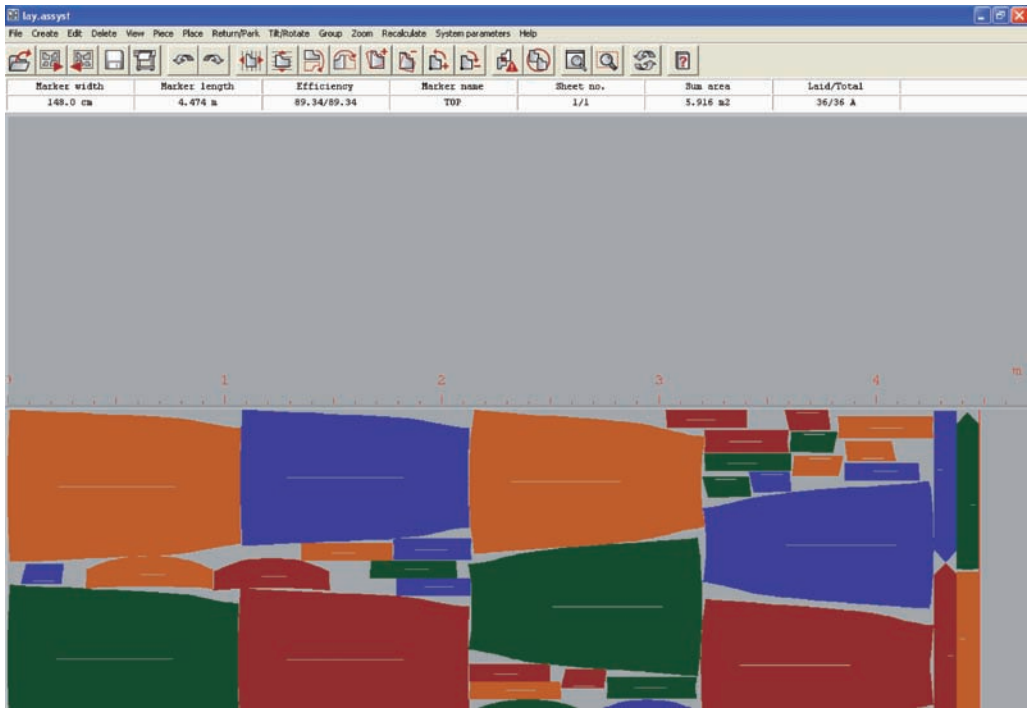
Automatic marker making

Most CADCAM systems will make markers automatically. Most large manufacturers now use the facility because improvements in computer hardware have increased the speed and levels of fabric utilisation. The system will try different methods of placing the pieces in the lay and will offer the best alternative.

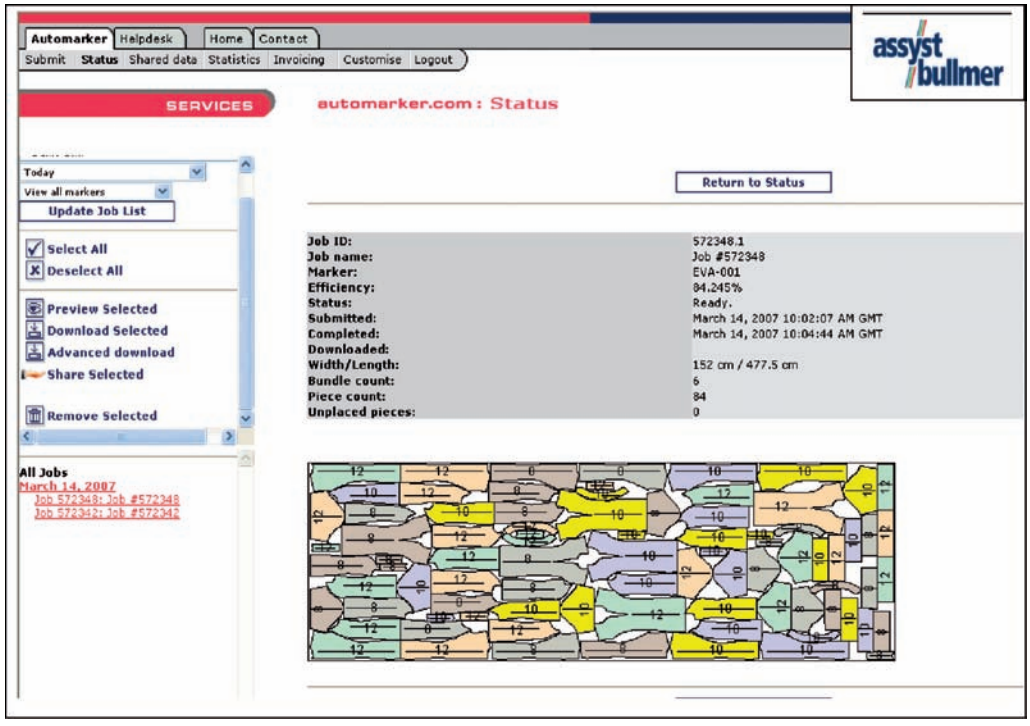
Distance marker making

Direct web-based marker making is now available by companies such as assyst-bullmer through *automarker.com.* It offers a global marker making service to manufacturers together with data security. Its advantage is the power of the main computer that offers quality markers across the world twenty four hours per day, every day. The service is aimed at manufacturers who are short of staff, have peak workloads, are wanting to expand their production, or those who have production spread across the world. It also provides a fast costing marker system for samples or single orders.

Compatibility between different CADCAM systems is no longer important; data transfer can take place between different pattern generation systems, plotters or cutters. The user can also watch the results online or inspect the markers when they have been completed.



The screen display of a marker making software program. *Illustration by permission of assyst-bullmer*.



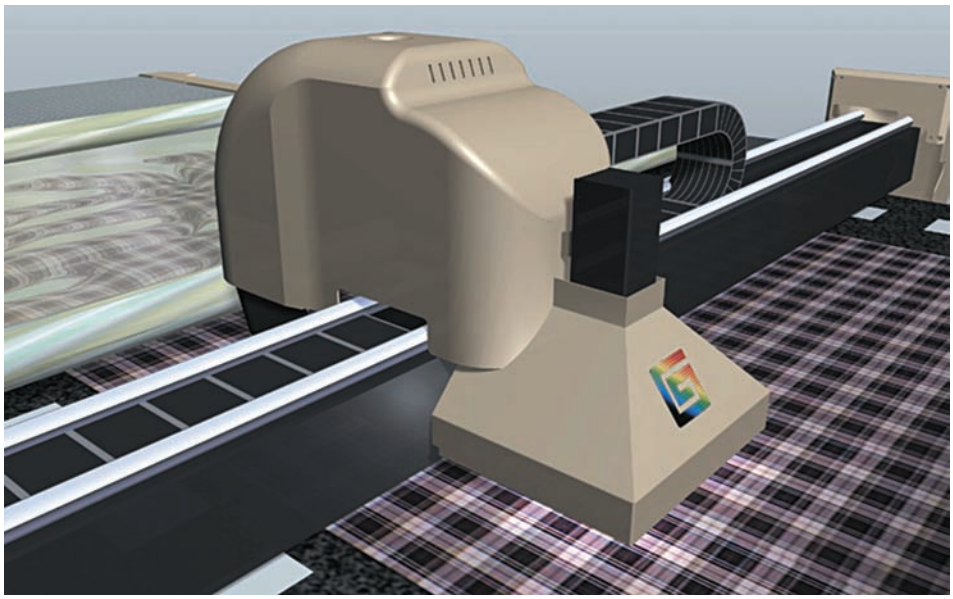
automarker.com provides markers for plotters and cutters across the world. *Illustration by permission of assyst-bullmer*.

Plotting and cutting

Markers can be plotted out on large plotters or small scale on A0 plotters (see photograph, page 204, for sample costings). The markers can be sent directly to high speed deep-ply cutters that cut through many layers of fabric. Smaller or specialised cutters have been developed for short runs, single garment or sample cutting.

Lectra and Gerber have developed cutters that use intelligent vision systems to improve stripe and plaid matching even when the fabric is distorted. The operator uses advanced camera optics to match the fabric pieces.

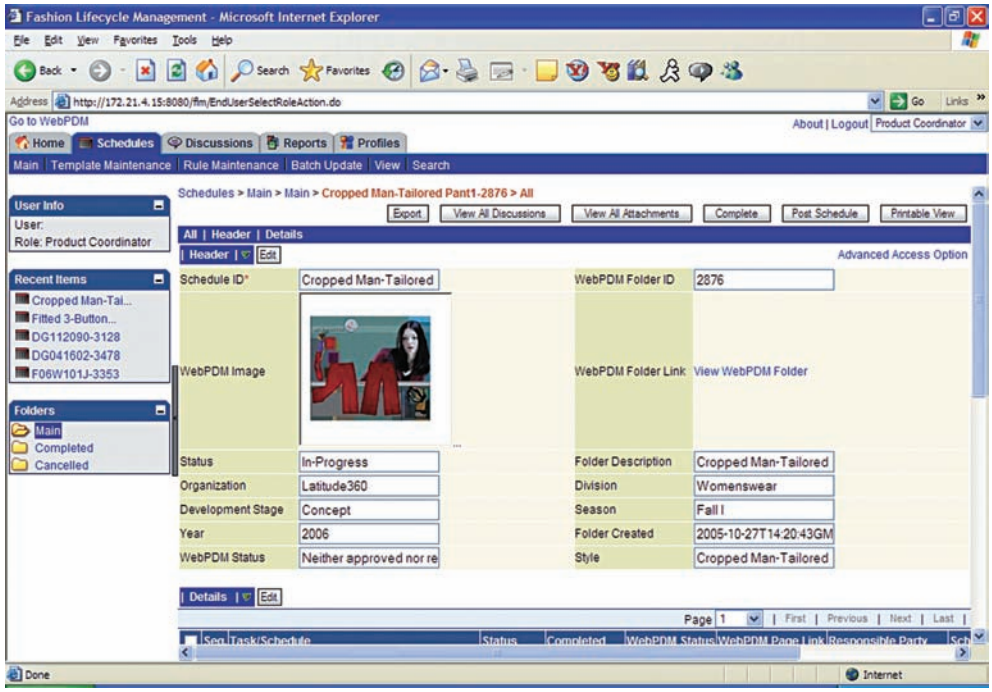
Deep-ply cutting on the *'Turbocut'* knife plotter. *Photograph by permission of assyst-bullmer.*



Automatic check matching in the *Invision* program. *Photograph by permission of Gerber.*

Product lifecycle management (PLM)

Web-based PLM systems allow manufacturers to create a central product information database that can be accessed globally, from manufacturer to retailer, from the earliest phase of the design process to the retailing of the garment. Integrated with PDM systems through the production cycle, it gives knowledge of product workflow and line management. The speed required to get fashionable styles to market requires a common information base throughout a product's lifecycle.



Seq.	Task/Schedule	Status	Schedule Due	Completed	Responsible Party	WebPDM Page Link	Discussion
1	Schedule Created	Completed		02-07-2007	Senior Designer Ladieswear		0
2	Sample Fabric Ordered	Completed	03-12-2007	03-06-2007	Assistant Designer Ladieswear		0
3	Design and Cost Specification	In-Progress			Assistant Designer Ladieswear		0
4	└ Design and Cost Specification	Completed	03-14-2007	03-14-2007	Assistant Designer Ladieswear	View WebPDM Page	0
5	AML Measurement Spec Worksheet Created	In-Progress			Technical Designer		0
6	└ AML Measurement Specification Worksheet	Completed	03-16-2007	03-16-2007	Technical Designer	View WebPDM Page	0
7	Construction Details	In-Progress			Technical Designer		0
8	└ Construction Details Manufacturing	Not-Completed			Technical Designer	View WebPDM Page	0
9	└ Construction Details Packaging	Completed	03-21-2007	03-21-2007	Technical Designer	View WebPDM Page	0
10	Style Revealed To Supplier	Completed	03-28-2007	03-28-2007	Sourcing/Costing Manager		0
11	Counter Sample	In-Progress			Technical Designer		0
12	Retail Cost Sheet approval	In-Progress			Merchandising Director		0
13	Order Passed	In-Progress			Merchandising Director		0
14	Fabric Approval	In-Progress			Ladiewear design Exec		0
15	Lab Dip approval	In-Progress			Ladiewear design Exec		0
16	Multi Sample Evaluation						
20	Photo Sample	In-Progress			Merchandising Director		0
21	Pattern Complete	Completed	03-22-2007	03-22-2007	Pattern Maker		0
22	Grading for production Complete	In-Progress			Pattern Maker		0
23	Production Sample Approval	In-Progress			Technical Designer		0
24	Received Into Distribution Centre	In-Progress			Quality Assurance Manager		0

The cover page of a PLM software program and a following page giving information about the status of a garment during its lifecycle to its completion. *Illustrations by permission of Gerber.*

Appendix: Aliquot parts

If a calculator is not available for working out fractional parts, the following table can be used. The table covers most of the popular sizes. (Figures in columns marked with an asterisk are calculated to one decimal place.)

Neck size (cm)

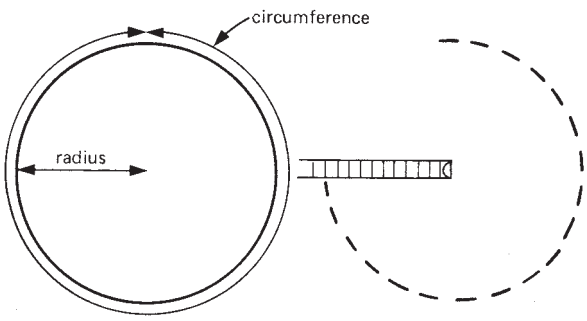
	*1/8	*1/5
34	4.3	6.8
35	4.4	7
36	4.5	7.2
37	4.6	7.4
38	4.8	7.6
39.2	4.9	7.8
40.4	5.1	8.1
41.6	5.2	8.3
42.8	5.4	8.6
44	5.5	8.8
45.2	5.7	9

Constructing a circle

Some patterns use circles as a base for their construction. The following calculations can be made to obtain the radius required to construct a circle.

- The circumference of a circle is the measurement around a circle.
- The radius is a line from the centre of the circle to the outer edge.
- To construct a circle the radius must be known. Radius = circumference divided by 6.28.

Worked example Waistline measurement is 68 cm; a circle is required whose circumference is 68 cm.
Radius = 68 ÷ 6.28 = 10.8
Construct a circle, radius 10.8 cm, its circumference will be 68 cm.



Bust, waist and hip (cm)

	*1/16	*1/12	*1/6	*1/4	*1/2
60	3.8	5	10	15	30
61	3.8	5.1	10.2	15.25	30.5
62	3.9	5.2	10.3	15.5	31
63	3.9	5.3	10.5	15.75	31.5
64	4	5.3	10.7	16	32
65	4.1	5.4	10.8	16.25	32.5
66	4.1	5.5	11	16.5	33
67	4.2	5.6	11.2	16.75	33.5
68	4.3	5.7	11.3	17	34
69	4.3	5.8	11.5	17.25	34.5
70	4.4	5.8	11.7	17.5	35
71	4.4	5.9	11.8	17.75	35.5
72	4.5	6	12	18	36
73	4.6	6.1	12.2	18.25	36.5
74	4.6	6.2	12.3	18.5	37
75	4.7	6.3	12.5	18.75	37.5
76	4.8	6.3	12.7	19	38
77	4.8	6.4	12.8	19.25	38.5
78	4.9	6.5	13	19.5	39
79	4.9	6.6	13.2	19.75	39.5
80	5	6.7	13.3	20	40
81	5.1	6.8	13.5	20.25	40.5
82	5.1	6.8	13.7	20.5	41
83	5.2	6.9	13.8	20.75	41.5
84	5.3	7	14	21	42
85	5.3	7.1	14.2	21.25	42.5
86	5.4	7.2	14.3	21.5	43
87	5.4	7.3	14.5	21.75	43.5
88	5.5	7.3	14.7	22	44
89	5.6	7.4	14.8	22.25	44.5
90	5.6	7.5	15	22.5	45
91	5.7	7.6	15.2	22.75	45.5
92	5.8	7.7	15.3	23	46
93	5.8	7.8	15.5	23.25	46.5
94	5.9	7.8	15.7	23.5	47
95	5.9	7.9	15.8	23.75	47.5
96	6	8	16	24	48
97	6.1	8.1	16.2	24.25	48.5
98	6.1	8.2	16.3	24.5	49
99	6.2	8.3	16.5	24.75	49.5
100	6.3	8.3	16.7	25	50
101	6.3	8.4	16.8	25.25	50.5
102	6.4	8.5	17	25.5	51
103	6.4	8.6	17.2	25.75	51.5
104	6.5	8.7	17.3	26	52
105	6.6	8.8	17.5	26.25	52.5
106	6.6	8.8	17.7	26.5	53
107	6.7	8.9	17.8	26.75	53.5
108	6.8	9	18	27	54
109	6.8	9.1	18.2	27.25	54.5
110	6.9	9.2	18.3	27.5	55
111	6.9	9.3	18.5	27.75	55.5
112	7	9.3	18.7	28	56

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